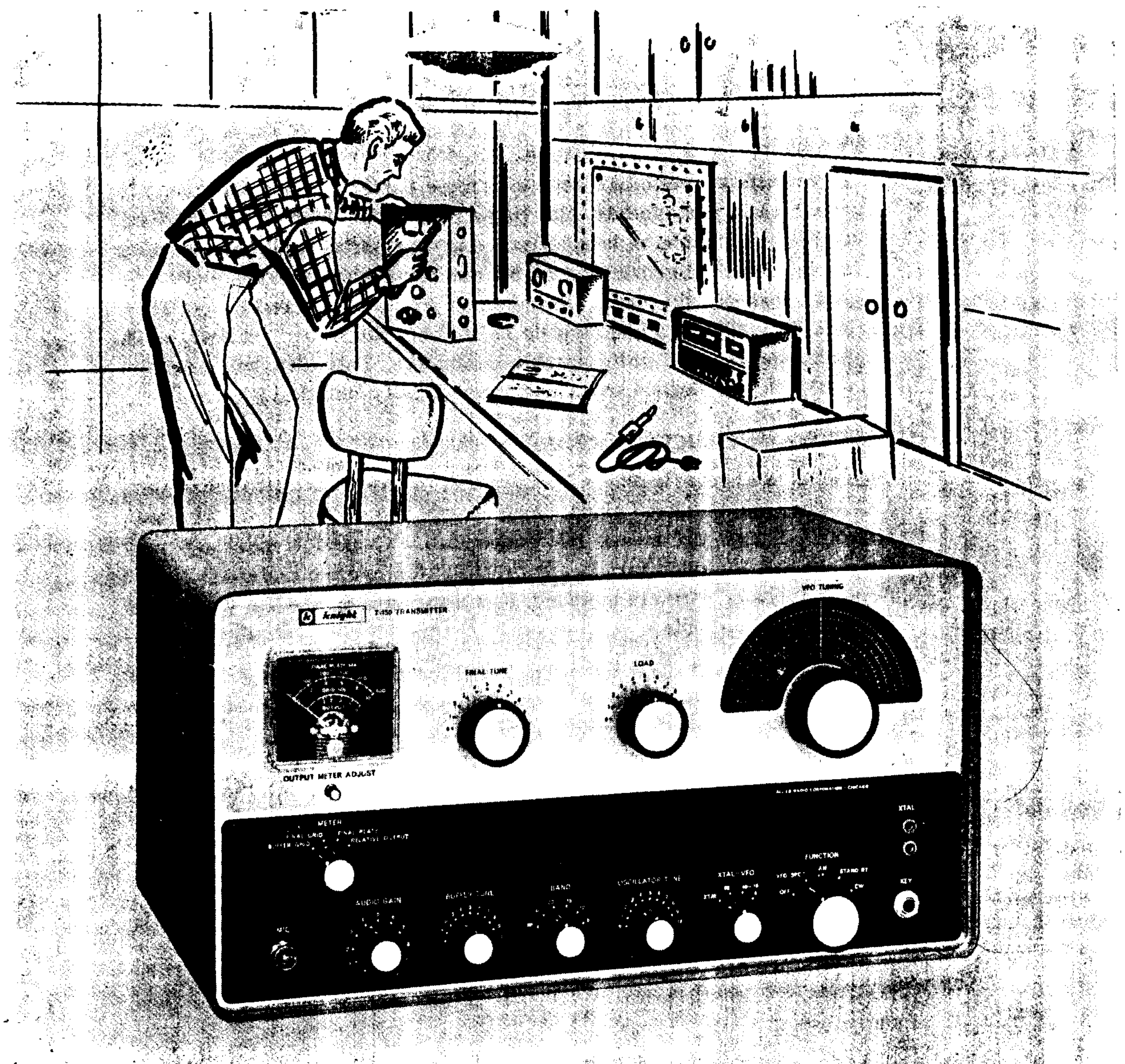


- HIGH-POWER: 150 WATTS INPUT ON 80 THROUGH 10; 100 WATTS ON 6 METERS
- BUILT-IN, HIGHLY STABLE VFO OR CRYSTAL OPERATION
- ADJUSTABLE PI OUTPUT NETWORK MATCHES A WIDE RANGE OF ANTENNAS
- AM PHONE AND CW OPERATION
- ALL STAGES KEYED — NO SHOCK VOLTAGE ON CONTACTS
- BANDSWITCH COVERAGE OF 80 THROUGH 6 METERS
- FULL METER SWITCHING

knight-kit

T-150

TRANSMITTER

The T-150 is a compact, high-power AM-CW transmitter that's sure to rate a place in your Ham setup. Providing bandswitching coverage of the 80 through 6 meter bands, the T-150 operates at a power input of 150 watts. Built-in AM modulation is provided by a combination of screen modulation and controlled carrier. Thus, at low cost, practically the equivalent talk-power of plate modulation is obtained.

Designed to provide a minimum of TVI, all leads going in-and-out of the case are bypassed for RF. There is more than ample gain in the audio circuit to operate from any high-impedance, dynamic or crystal microphone. Keying is clean and chirpless with no hazardous voltages at the key contacts.

SPECIFICATIONS

OUTPUT FREQUENCIES	3.5-4 MC 7.0-7.3 MC 14.0-14.35 MC 21.0-21.45 MC 28.0-29.7 MC 50.0-54.0 MC
POWER INPUT TO FINAL	150 Watts nominal on 80-10 meters 100 Watts on 6 meters
FREQUENCY CONTROL	Crystal or VFO
OUTPUT CIRCUIT	Pi-Network, 40-600 ohms, coax output connector.
VFO DRIFT	Only 200 cycles from 10 to 30 minutes
ACCESSORY OUTPUTS	700 V DC at 50 MA 6.3 VAC at 1 amp
TUBES	12BY7 Variable Frequency Oscillator (VFO) 6CL6 Crystal Oscillator 7189 Buffer/Multiplier 12AX7 Speech Amplifier 6DR7 Modulator OA2 Voltage Regulator 2-6146 RF Output Amplifiers
MODULATION	Controlled carrier, screen modulation.
TVI REDUCTION	The transmitter is fully shielded by its cabinet, thus assuring minimum harmonic radiation. Filtering and bypassing of AC and keying leads is provided, and generous bypassing of the meter and heater circuits is included.
MICROPHONE INPUT	Accepts crystal microphone on front panel.
CW KEYING	Key jack accepts standard 2 connector ¼″ plug.
TYPES OF EMISSION	AM-Amplitude Modulation CW-Continuous Wave
POWER SOURCE	105-125 Volts, 60 cycles, AC
POWER CONSUMPTION	Standby: 180 watts. AM: 280 watts. CW: 350 watts.

CONSTRUCTION HINTS

UNPACKING

☐ If you are not familiar with electronic parts, we suggest that you check each part against the parts list in the rear of the manual. If you are unable to identify some of the parts, find their pictures on the wiring illustrations or on the parts identification photo. As you check off the parts, assort them so they are readily available. You may find it advantageous to sort the hardware (screws, nuts, lockwashers, etc.) into suitable containers. This step will acquaint you with the various parts and thus simplify building.

HELPFUL CONSTRUCTION HINTS

This book uses some symbols for the value of the parts. "Ω" means ohm, "K" means one thousand ohms, "meg" means one million ohms, μf means microfarad, and $\mu\mu$f means micromicrofarad. Capacitor markings may be μf or MF for microfarad; $\mu\mu$f or MMF for micromicrofarad.
Several types of wire are supplied. It is important to use the wire called for in the building step.

Insulated solid and stranded wire, identified by color, has been cut to length and prestripped for your convenience. Use only the color given in the step.

The construction of this kit will require the use of a soldering iron, rated at about 100 watts, a pair of long-nose pliers, a pair of diagonal cutters, and a screwdriver.

Follow the step-by-step instructions exactly. DO NOT ATTEMPT TO WIRE THIS KIT FROM THE PICTORIALS OR SCHEMATIC DIAGRAM ALONE because a definite wiring sequence must be followed. Occasionally, several parts are mounted with the same hardware, so BE SURE TO READ THE ENTIRE STEP. Check off each step after you have completed it.

To make a good mechanical connection, simply insert the end of the lead through the hole in the terminal; wrap the lead around the terminal and cut off the excess wire. Clamp the connection with your long-nose pliers.

Flexible tubing is used to cover bare wire or leads where there is a chance they may touch other bare wires or the chassis. BARE WIRES AND BARE LEADS NOT CONNECTED TO THE SAME TERMINAL MUST NOT ACCIDENTALLY TOUCH EACH OTHER OR THE CHASSIS.

THIS KIT MUST BE PROPERLY SOLDERED!

USE ENOUGH HEAT

This is the main idea of good soldering. Apply enough heat to the metal surfaces you are joining to make the solder spread freely, until the contour (shape) of the connection shows under the solder.

AN ELECTRONIC UNIT WILL NOT WORK . . . unless it is properly soldered. Read these instructions carefully to understand the basic ideas of good soldering.

Enough heat must be used so the solder can actually penetrate the metal surfaces, making an unbroken path over which electricity can travel. You are not using enough heat if the solder barely melts and forms a rounded ball of rough, flaky solder.

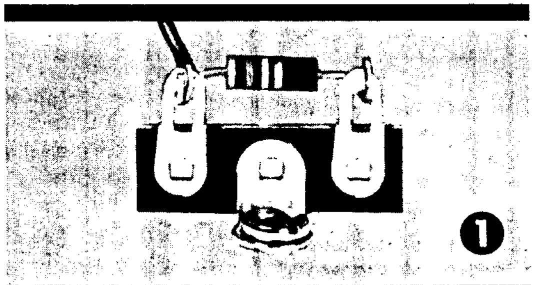
Use the Right Soldering Tool

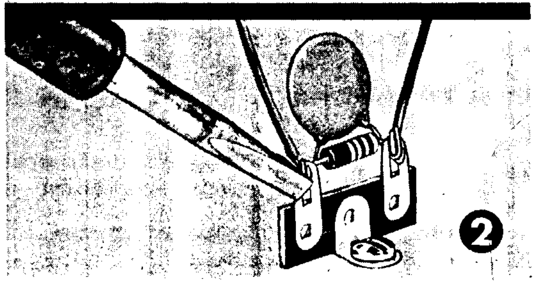
A soldering iron in the 40-100 watt range is recommended. Any iron in this range with a clean, chisel-shaped tip will supply the correct amount of heat to make a good solder connection. You may also use a solder gun but make sure the tip reaches full heat before you solder.

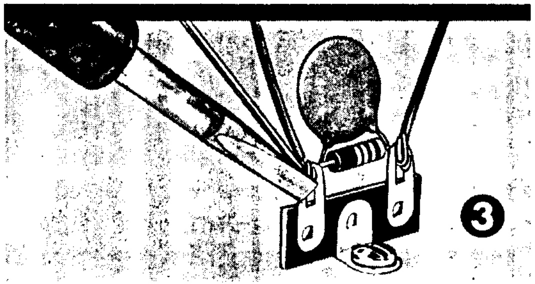
Keep the iron or gun tip brightly coated with solder. When necessary, wipe the hot tip clean with a cloth. If you are using an old tip, clean it before you start soldering. Use a fine file or steel wool to expose the bright metal. Heat the iron and immediately coat the tip with solder.

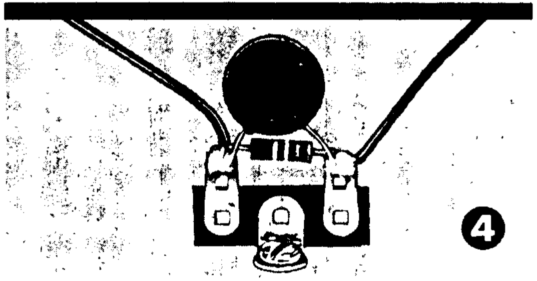
Use Only Rosin Core Solder

We supply the right kind of solder (*rosin core solder*). Do not use any other kind of solder! **Use of Acid Core Solder, Paste, or Irons Cleaned on a Sal Ammoniac Block will ruin any Electronic Unit and will Void the Guarantee.**









HERE'S HOW TO DO IT . . .

1. Join bare metal to bare metal; insulation must be removed. Make good mechanical connections and keep resistor and capacitor leads as short as possible, unless otherwise specified.

2. Coat the tip of a hot iron with solder. Then **Firmly Press the Flat Side of the Tip** against the parts to be soldered together. Keep the iron there while you . . .

3. Apply the solder between the iron tip and the metal to be soldered. Use only enough solder to flow over all surfaces of the connection, and all wires in the connection. Remove the iron.

Do Not Move Parts Until the Solder Hardens. If you accidentally move the wires as the solder is hardening, apply your iron and reheat.

4. Compare your soldering with the pictures on this page. You have a good connection if your solder has flowed over all surfaces to be connected, following the shape of the surfaces. It should appear smooth and bright and all wires in the connection should be well-soldered.

You Have Not Used Enough Heat: If your connection is rough and flaky-looking, or if the solder has formed a round ball instead of spreading.

The difference between good soldering (enough heat) and poor soldering (not enough heat) is just a few extra seconds with a hot iron firmly applied. Remember, larger metal surfaces take a longer time to heat.

PARTS MOUNTING ON THE CHASSIS

SEE FIGURES 1 AND 2.

☑ Position the chassis as shown in Figure 1.

The following control and switch have locating tabs which are inserted in the locating holes in the chassis. Mount each part with a ⅜″ nut.

- ☑ S-4, single wafer switch.
- ☑ R-23, 100K control (the control with the short shaft).

☑ 9-pin tube socket without center pin for V-5. Position with the keyway (the wide space between two of the pins) as shown. Mount with two 4-40 x ¼″ screws, lockwashers and nuts.

☑ Four 9-pin tube sockets and four shield bases for V-1 through V-4. The socket with the center pin is V-1. Position the shield bases on top of the chassis and the sockets on the bottom with the keyways positioned as shown. Mount each with two 4-40 x ¼″ screws, #4 lockwashers and nuts as shown in Figure 3.

☑ Bend down the four ground lugs on each of the five sockets mounted.

☑ 7-pin tube socket for V-6. Position with keyway as shown. Mount with two 4-40 x ¼″ screws, lockwashers and nuts.

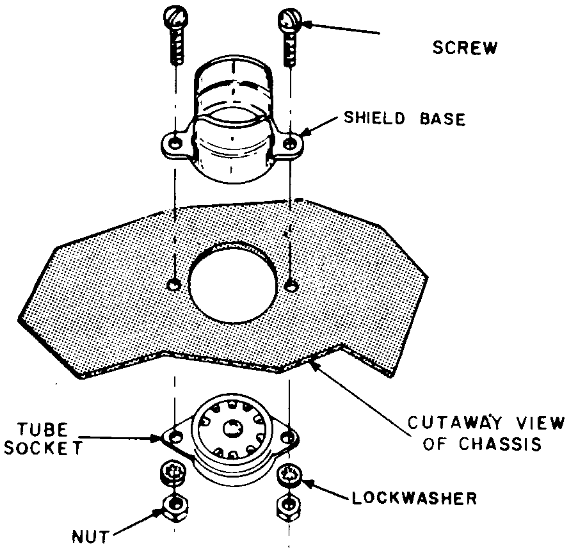


FIGURE 3. SHIELD BASE MOUNTING

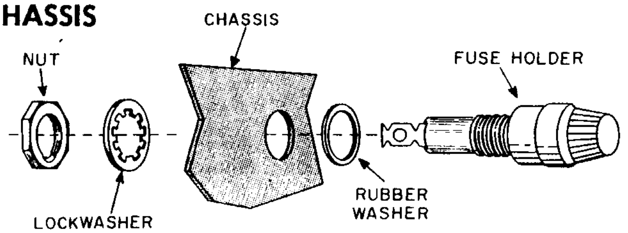


FIGURE 4. FUSE HOLDER MOUNTING

☑ Two 8-pin tube sockets for V-7 and V-8, and two #6 solder lugs. Position the sockets with the keyways (notch) as shown. Mount each socket and a solder lug with two 6-32 x ¼″ screws, a lockwasher and two nuts.

☑ Large grommet. Mount in the hole shown.

☑ Four medium grommets. Mount in the holes shown.

☑ Fuse holder. Position with the terminals as shown. Mount as shown in Figure 4.

☑ Ground post, a 10-32 screw, lockwasher, nut and wing nut. Assemble as shown in Figure 5.

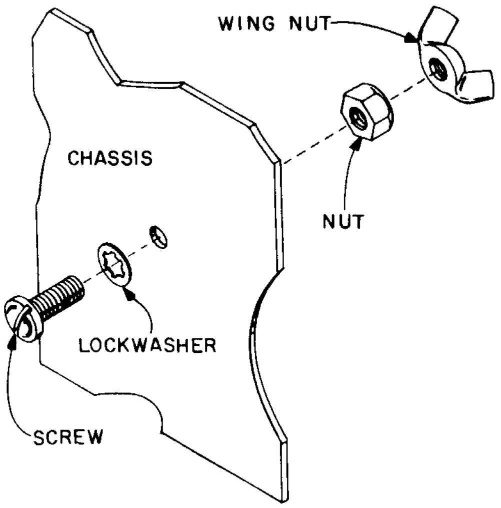


FIGURE 5. GROUND POST ASSEMBLY

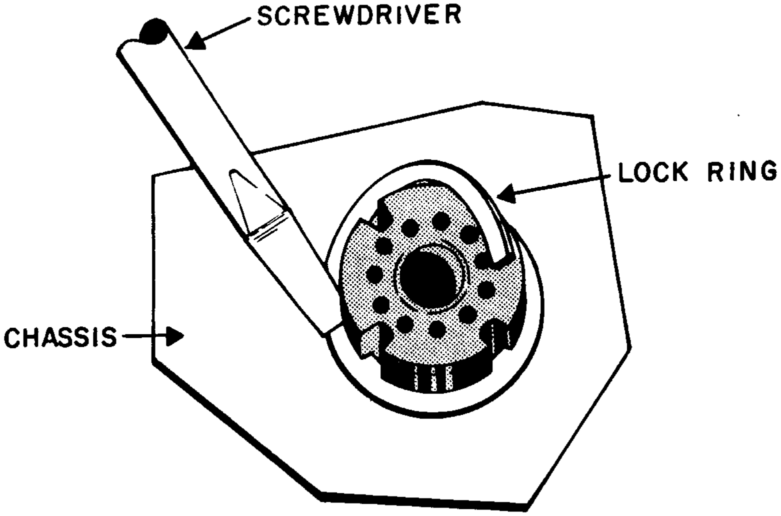


FIGURE 6. MOUNTING J-2

☑ J-7, antenna jack. Mount from outside the chassis using three 4-40 x 1/4″ screws, lockwashers and nuts—**in the holes shown.** The fourth mounting screw will be used later to mount another part.

☑ J-2, 11-pin socket. Mount with a lock ring as shown in Figure 6.

☑ J-1, 8-pin socket and a #6 solder lug. Position the keyway to the right, away from J-2. Mount the socket and the solder lug with two 6-32 x 1/4″ screws, a lockwasher and two nuts.

NOTE: There are different types of 2, 3 and 5-terminal strips used in the transmitter. When mounting the terminal strip be sure to select the correct type. See the parts identification in the rear of the manual for the terminal strip identification.

Position the following terminal strips as shown. Mount each with a 6-32 x 1/4″ screw, lockwasher and nut.

- ☐ TS-1. 5-terminal strip.
- ☐ TS-2, standup 6-terminal strip.
- ☑ TS-3 and TS-4, two 3-terminal strips.
- ☑ TS-5, 3-terminal strip.
- ☐ TS-6, 2-terminal strip.
- ☑ TS-7, 2-terminal strip and an angle clip. From the chassis top, insert the screw through the angle clip, the chassis and the mounting foot of TS-7. Position the clip as shown in Figure 2 and fasten with a lockwasher and nut.
- ☑ TS-8, 3-terminal strip.
- ☐ TS-9, 5-terminal strip.
- ☐ TS-10, 4-terminal strip.
- ☐ TS-11, 2-terminal strip (near R-23).
- ☐ TS-15, 3-terminal strip.

☐ Mounting plate for C-48. Mount from inside the chassis with two 4-40 x 1/4″ screws, lockwashers and nuts.

☐ C-48, 40/40 μf, 450 volt electrolytic capacitor. Mount by inserting the mounting tabs in the holes in the plate. Fasten by twisting the tabs 1/4 turn.

NOTE: The following 20 watt resistors are wire wound stand-ups.

☐ R-32, 10Ω, 20 watt resistor. Mount with a 6-32 x 1/4″ screw, lockwasher and nut.

☑ R33, 150Ω, 20 watt resistor and TS-16, 2-terminal strip. Mount with a common 6-32 x 1/4″ screw, lockwasher and nut.

☑ R-37, 4K, 10 watt resistor. Mount with a 6-32 x 1/4″ screw, lockwasher and nut.

☑ R-34, 150Ω, 20 watt resistor and C-47, 40 μf, 450 volt electrolytic capacitor. Position the capacitor with the leads as shown. Mount C-47 and R-34 with a 6-32 x 1/4″ screw, lockwasher and nut.

☑ Connect the black lead of C-47 to terminal 2 of C-48.

☐ Connect the red lead of C-47 to terminal 11 of J-2.

☑ C-46, 40μf, 450 volt electrolytic capacitor, and an angle clip. Insert a 6-32 x 1/4″ screw through the angle clip and position on top of the chassis as shown in Figure 2. Mount C-46 on the screw, leads positioned as shown, and fasten with a lockwasher and nut.

☑ Connect the black lead of C-46 to terminal 1 of C-48.

☐ Connect the red lead of C-46 to terminal 2 of R-33.

☑ T-1, power transformer. Position with the leads as shown. Mount with four 8-32 lockwashers and nuts.

IMPORTANT INSTRUCTIONS

THE INSTRUCTION CONNECT MEANS: Connect the wire or lead to the given point. Make a firm mechanical connection BUT DO NOT SOLDER AT THIS TIME. Later another wire or wires will be connected to this point.

THE INSTRUCTION SOLDER MEANS: Connect the wire or lead to the given point and then solder the terminal and all connections in it. If there is more than one wire in the connection, the amount will be stated—for example (2 wires). After soldering a connection trim all wires as close as possible to the terminal.

NOTE: The transformer leads may be shortened for neater connections.

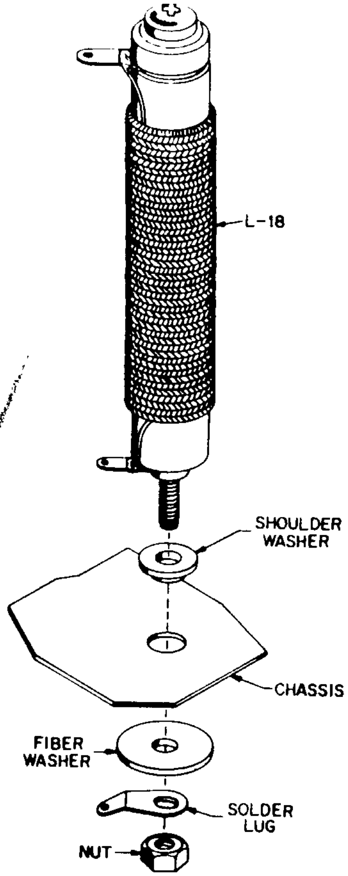


FIGURE 7. MOUNTING L-18

Connect the leads of T-1 as follows:

☑ Either of the red leads. Cut 4″ off this lead. Remove ½″ insulation from the end. Twist the strands together and coat lightly with solder. Solder this lead to terminal 2 of R-32.

☐ Two black leads. Cut 2″ off each lead. Remove ½″ of insulation from each lead. Twist the stranded wires together and coat lightly with solder. Connect one of the leads to terminal 2 of TS-5. Connect the other lead to terminal 3 of TS-5.

☐ The other red lead. Connect to terminal 8 of J-2.

☐ Either of the green leads. Solder to terminal 1 of J-2.

☐ The other green lead. Cut 5″ off this lead. Remove ½″ of the insulation from the end. Twist the stranded wires together and coat lightly with solder. Connect to terminal 2 of TS-4.

☑ L-18, shoulder washer, fiber washer, #8 solder lug and an 8-32 nut. Assemble as shown in Figure 7. Do not overtighten the nut as the coil form will be damaged.

☑ Large L shaped bracket. Mount on the top of the chassis with two 6-32 x ¼″ screws, lockwashers and nuts.

NOTE: When mounting the variable capacitors, be sure the blades are closed all the way.

☐ C-16 and C-21, two variable capacitors (part #286053). Mount each with three 6-32 x ¼″ screws and lockwashers. The lockwashers go under the screw heads. Bend the terminals of C-16 and C-21 up as shown.

☐ C-35, variable capacitor (part #286056). Mount to the large L bracket with two 6-32 x ¼″ screws and lockwashers.

☐ C-32, variable capacitor (part #286057). Mount to the large L bracket with two 8-32 screws and lockwashers.

☑ Control bracket. Mount with two 6-32 x ¼″ screws, lockwashers and nuts.

☑ R-16, 100K control (long shaft). Mount to the control bracket with a ⅜″ lockwasher and nut.

☑ TS-12, 1-terminal strip. Mount with a 6-32 x ¼″ screw, lockwasher and nut.

☑ A ceramic spacer, two #8 solder lugs, two 6-32 x ¼″ screws and lockwashers. Fasten the solder lugs to the spacer as shown in Figure 8. Fasten the spacer to the top of the chassis near the rear edge as shown in Figure 2.

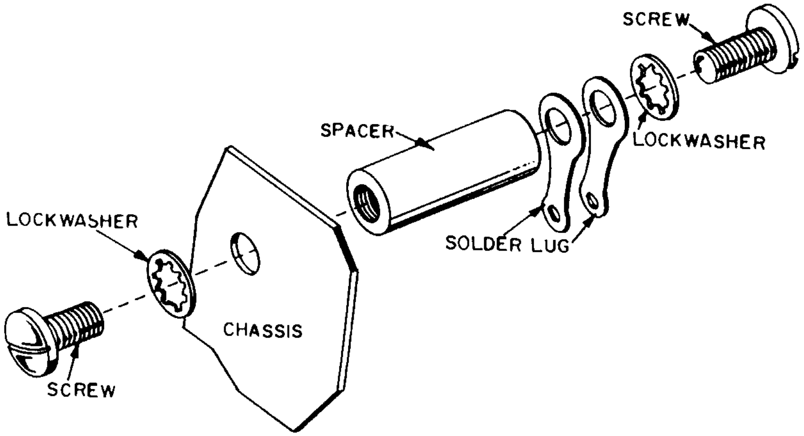


FIGURE 8. SPACER MOUNTING

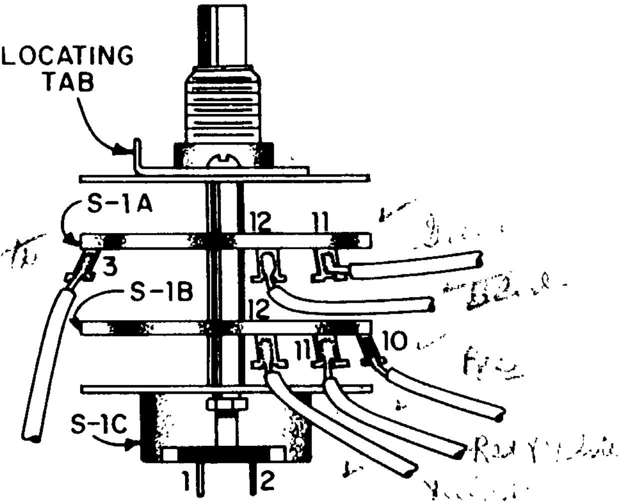


FIGURE 9. PREWIRING S-1

PREWIRING S-1

SEE FIGURE 9.

NOTE: When pre-wiring the switches, mount the switches on the outside of the chassis. Note that the locating tabs will not fit into the locating holes when the switch is mounted in this position. In this position the switch terminals are correctly positioned and easily obtainable.

☐ S-1, 3-wafer switch. Position the switch with the terminals and locating tab as shown in Figure 9.

☑ Brown wire. Solder one end to terminal 10 of S-1B. The other end will be connected later.

☑ 12″ red-white wire. Solder one end to terminal 11 of S-1B. The other end will be connected later.

☑ Yellow wire. Solder one end to terminal 12 of S-1B. The other end will be connected later.

☑ Green wire. Solder one end to terminal 11 of S-1A. The other end will be connected later.

☐ Blue wire. Solder one end to terminal 12 of S-1A. The other end will be connected later.

☑ Yellow-white wire. Solder one end to terminal 3 of S-1A. The other end will be connected later.

finish 4th
Bot pg 9
Buy [illegible]
+ Connect →

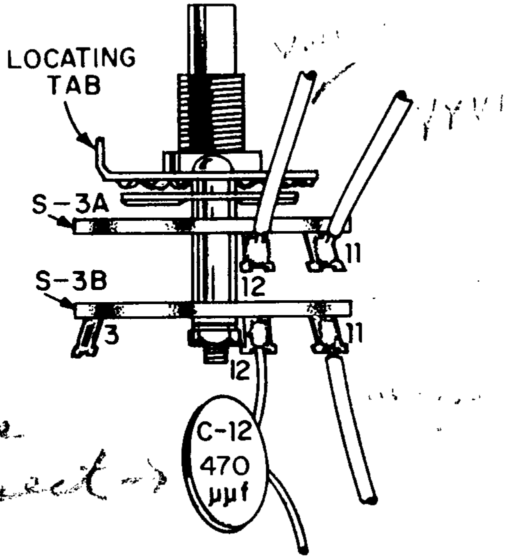


FIGURE 10. PREWIRING S-3

☑ Set the switch aside. It will be mounted later.

PREWIRING S-3

SEE FIGURE 10.

☑ S-3, 2-wafer switch. Position the switch with the terminals and locating tab as shown in Figure 10.

☑ Yellow wire. Solder one end to terminal 12 of S-3A. The other end will be connected later.

☑ Yellow-white wire. Solder one end to terminal 11 of S-3A. The other end will be connected later.

☑ Orange wire. Solder one end to terminal 11 of S-3B. The other end will be connected later.

☑ C-12, 470 $\mu\mu$f disc capacitor. Cut one lead so it is 1¼″ long. Solder this lead to terminal 12 of S-3B. The other lead will be connected later.

☑ Go back and check the wiring of both switches before continuing.

FIRST WIRING ON THE BOTTOM OF THE CHASSIS

SEE FIGURE 11.

NOTE: Position the chassis so it is not resting on L-18, to prevent its being damaged.

☑ Bottom shield and an angle clip. Fasten the angle clip to the bottom shield, as shown, with a 6-32 x 3/16″ screw and lockwasher.

☑ S-3, the pre-wired switch and the bottom shield. Insert the shaft of S-3 through the bottom shield, the chassis and fasten on the outside of the chassis with a ⅜″ nut. Be sure the locating tab enters the locating hole. A #6

☑ Ceramic spacer, ~~two~~ #8 solder lugs, two 6-32 x ¼″ screws and lockwashers. Place a lockwasher over one screw and insert the screw through the angle clip mounted to the bottom shield, and through the chassis. Mount the ceramic spacer on the screw as it protrudes through the top of the chassis. Fasten the solder lugs to the top of the spacer and position as shown in Figure 2.

☑ S-1, the other pre-wired switch. Fasten to the chassis, locating tab in the locating hole, with a ⅜″ nut.

NOTE: Position all wires as close to the chassis as possible.

☑ Orange wire. Connect one end to ground lug A of V-5. Insert the other end through the cutout, it will be connected later.

☑ Small red-white **stranded** wire. Solder one end to ground lug A of V-5 (2 wires). Insert the other end through the cutout shown, it will be connected later.

☑ Green wire. Solder one end to terminal 11 of S-4. Insert the other end through the cutout shown, it will be connected later.

☑ Yellow wire. Solder one end to terminal 10 of S-4. Insert the other end through the cutout shown, it will be connected later.

☑ Gray wire. Solder one end to terminal 9 of S-4. Connect the other end to the solder lug between V-3 and V-7.

☑ Orange wire. Solder one end to terminal 7 of S-4. Connect the other end to terminal 1 of TS-10.

☑ Orange wire. Solder one end to pin 4 of V-5. Connect the other end to pin 9 of V-4.

☑ R-28, 1 meg resistor (brown, black, green). Insert one lead through pin 2 of V-5 and solder the end to pin 6 of V-5. Solder pin 2 of V-5. Connect the other lead to terminal 1 of TS-1.

☑ Two ¾″ pieces of small bare wire. Connect as follows:

- ☑ Bare wire. Solder one end to pin 5 of V-5. Solder the other end to ground lug C of V-5.
- ☑ Bare wire. Solder one end to pin 8 of V-5. Solder the other end to ground lug D of V-5.

NOTE: There are two .005 μf disc capacitors rated at 1000 volts used in this kit. They are stamped IKV and should only be used where specified. The remainder of the .005 μf disc capacitors are rated at 600 volts and are unstamped.

☑ C-49, .005 μf disc capacitor. Connect one lead to terminal 1 of TS-1. Connect the other lead to terminal 2 of TS-1.

☑ C-41, .1 μf tubular capacitor. Solder the end marked with a band to ground lug D of V-3. Connect the other lead to terminal 4 of TS-1.

☑ Yellow-white wire from terminal 3 of S-1A. Connect the free end to terminal 5 of TS-1.

☑ Orange wire. Connect one end to pin 9 of V-4. Connect the other end to pin 4 of V-3.

☑ Yellow wire. Connect one end to pin 4 of V-3. Connect the other end to pin 7 of V-7.

☑ ¾″ piece of the small bare wire. Solder one end to pin 5 of V-3. Connect the other end to ground lug C of V-3.

☑ C-33, .005 μf, **1000 volts (stamped IKV)** disc capacitor. Connect one lead to ground lug C of V-3. Connect the other lead to the solder lug.

☑ C-52, .005 μf disc capacitor. Solder one lead to ground lug C of V-3 (3 wires). Solder the other lead to pin 4 of V-3. (3 wires).

☑ C-20, .005 μf disc capacitor. Connect one lead to pin 3 of V-3. Connect the other lead to ground lug A of V-3.

☑ C-18, .005 μf disc capacitor. Connect one lead to pin 9 of V-3. Connect the other lead to ground lug A of V-3.

☑ R-9, 390 Ω, 1 watt resistor (orange, white, brown). Solder one lead to pin 3 of V-3 (2 wires). Connect the other lead to terminal 4 of TS-10.

☑ Green wire. Connect one end to terminal 4 of TS-10. Connect the other end to terminal 5 of TS-9.

☑ R-15, 10 Ω, 5% 1 watt resistor (brown, black, black, gold). Connect one lead to terminal 2 of TS-8. Solder the other lead to the solder lug (3 wires).

☑ White wire. Connect one end to terminal 2 of TS-8. Insert the other end through the cutout shown.

☑ Orange wire. Solder one end to pin 6 of V-2. Connect the other end to terminal 2 of C-16.

☑ 1″ piece of the small bare wire. Solder one end to pin 7 of V-2. Connect the other end to ground lug C of V-2.

☑ C-51, .005 μf disc capacitor. Connect one lead to pin 5 of V-2. Solder the other lead to ground lug C of V-2 (2 wires).

NOTE: The coils in this kit are coded with a color dot, or, if encased in plastic, by the color of the case. Coils L-21, L-22, and L-23 are identical and have no color dot, or if encased, are in clear plastic. +L 8 BLACK DOT

☑ L-23, 2.2 μh coil. Connect one lead to terminal 1 of TS-7. Connect the lead to pin 6 of V-1.

☑ C-14, .005 μf disc capacitor. Insert one lead through ground lug B of V-2 and solder to pin 4 of V-2. Solder ground lug B. Connect the other lead to pin 1 of V-2.

☑ R-6, 390 Ω resistor (orange, white, brown). Solder one lead to pin 1 of V-2 (2 wires). Connect the other lead to terminal 5 of TS-9.

SEE FIGURE 11.

- ☑ C-54, .005 μf disc capacitor. Connect one lead to ground lug D of V-2. Connect the other lead to terminal 4 of TS-9.
- .05 MF ☐ C-15, ~~470 μμf~~ disc capacitor. Solder one lead to ground lug D of V-2 (2 wires). Connect the other lead to terminal 1 of TS-9.
- ☑ Orange wire from S-3. Solder the free end to pin 2 of V-2.
- ☑ C-12, the 470 μμf disc capacitor from S-3. Cut a 1⅜″ piece of small tubing from the quantity supplied and slip it over the free lead of C-12. Connect this lead to pin 7 of V-1.
- ☑ Yellow wire from S-3. Connect the free end to terminal 3 of TS-15.
- ☑ Yellow-white wire from S-3. Solder the free end to pin 5 of V-6.
- ☑ 1⅛″ piece of the small bare wire. Connect one end to ground lug B of V-1. Slip the other end through pin 3 of V-1 and connect it to the center pin of V-1.
- ☑ ½″ piece of small bare wire. Connect one end to ground lug A of V-1. Solder the other end to the center pin of V-1 (2 wires).
- ☑ ¾″ piece of small bare wire. Solder one end to pin 3 of V-1 (3 wires). Slip the other end through pins 4 and 5 of V-1 and connect the other end to ground lug C of V-1.
- ☑ 1⅜″ piece of small bare wire. Connect one end to terminal 2 of TS-7. Solder the other end to pin 4 of V-1 (3 wires).
- ☑ C-8, .005 μf disc capacitor. Connect one lead to terminal 1 of TS-7. Solder the other lead to pin 5 of V-1 (3 wires).
- ☑ R-1, 15K resistor (brown, green, orange). Solder one lead to terminal 2 of TS-7 (2 wires). Connect the other lead to pin 2 of V-1.
- ☑ Green wire from S-1A. Connect the free end to terminal 4 of TS-9.
- ☑ Blue wire from S-1A. Connect the free end to terminal 1 of C-48.
- 18K ☑ Brown wire from S-1B Solder the free end to terminal 5 of J-1.
- ☑ Red-white wire from S-1B. Solder the free end to terminal 3 of J-2.
- ☑ J-4, key jack. Mount with the terminals positioned as shown with a ⅜″ lockwasher and nut. The lockwasher goes inside the chassis.
- ☑ Yellow wire from S-1B. Connect the free end to terminal 3 of J-4.
- ☑ 12″ red-white wire. Solder one end to terminal 2 of S-1C. Connect the other end to terminal 1 of TS-5.
- ☑ 12″ red-white wire. Connect one end to terminal 1 of S-1C. Solder the other end to terminal 3 of TS-5 (2 wires).
- ☑ Violet wire. Connect one end to terminal 1 of J-4. SOLDER ~~Connect~~ the other end to terminal 5 of TS-9. 3 WIRES
- ☑ Blue wire. Solder one end to terminal 1 of C-48 (3 wires). Connect the other end to terminal 2 of R-34.
- ☑ Red wire. Solder one end to terminal 2 of R-37. Connect the other end to pin 1 of V-6.
- ☑ C-58, .005 μf disc capacitor. Connect one lead to pin 1 of V-6. Connect the other lead to pin 7 of V-6.
- ☑ Brown wire. Solder one end to pin 1 of V-6 (3 wires). Connect the other end to terminal 1 of TS-8.
- ☑ Yellow wire. Solder one end to mounting tab A of C-48. Solder the other end to pin 7 of V-6 (2 wires).
- ☑ Green wire. Connect one end to terminal 2 of R-34. Solder the other end to terminal 1 of J-1.
- ☑ 1¼″ small bare wire. Solder one end to terminal 2 of R-34 (3 wires). Connect the other end to terminal 2 of TS-16.
- ☑ R-38, 68K, 2 watt resistor (blue, gray, orange). Connect one lead to terminal 2 of TS-16. Connect the other lead to terminal 2 of TS-6.
- ☑ R-36, 39K, 2 watt resistor (orange, white, orange). Connect one lead to terminal 2 of TS-16. Connect the other lead to terminal 1 of TS-6.
- ☑ Orange wire. Solder one end to terminal 1 of R-34. Solder the other end to terminal 7 of J-2.
- ☑ R-35, 12K, 2 watt resistor (brown, red, orange). Connect one lead to terminal 1 of TS-6. Connect the other lead to terminal 2 of R-33.
- ☑ 12″ red-white wire. Solder one end to terminal 1 of R-37. Connect the other end to terminal 4 of TS-9.
- ☑ Red wire. Solder one end to terminal 2 of R-33 (3 wires). Solder the other end to terminal 8 of J-1.
- ☑ Red wire. Solder one end to terminal 6 of J-1. Connect the other end to the solder lug.
- ☑ Red wire. Solder one end to the solder lug near J-1 (2 wires). Solder the other end to terminal 9 of J-2.
- ☑ Yellow wire. Solder one end to terminal 10 of J-2. Solder the other end to terminal 1 of R-33.
- ☑ 12″ red-white wire. Solder one to terminal 11 of J-2 (2 wires). Connect the other end to terminal 1 of TS-2.

NOTE: There are two types of large tubing. One is made of woven fiberglass and coated with varnish. The other type is a single 3″ piece of smooth tubing that resembles rubber tubing. Use only the type specified.

- ☑ 4¾″ piece of the large bare wire. Place a 4″ piece of the large fiberglass tubing over the wire. Connect one end to the terminal of J-7. Insert the other end through the grommet shown. It will be connected later.
- ☑ Yellow wire. Place a 3½″ piece of the large fiberglass tubing over the wire. Connect one end to the terminal of J-7. Leave the other end free, it will be connected later.

SEE FIGURE 11.

☑ R-17, 4.7K resistor (yellow, violet, red). Cut one lead so it is ½" long. Solder this lead to the terminal of J-7 (3 wires). Leave the other lead free, it will be connected later.

NOTE: Coils L-21 and L-22 are identical. These two coils are the coils ~~without any color~~ dot. BLACK DOT

☑ L-22, 2.2 μhy coil. Solder one lead to terminal 1 of TS-5 (2 wires). Connect the other lead to terminal 1 of TS-4.

☑ L-21, 2.2 μhy coil. Connect one lead to terminal 2 of TS-5. Connect the other lead to terminal 3 of TS-4.

☑ C-45, .001 μf disc capacitor. Connect one lead to terminal 1 of TS-4. Connect the other lead to terminal 2 of TS-4.

☐ C-44, .001 μf disc capacitor. Solder one lead to terminal 2 of TS-4 (3 wires). Connect the other lead to terminal 3 of TS-4.

☑ Red wire. Solder one end to terminal 3 of TS-4 (3 wires). Solder the other end to terminal 2 of the fuse holder.

☑ C-29, .005 μf disc capacitor. Position the capacitor in the center of tube socket V-8 as shown. Solder one lead to pin 4 of V-8. Connect the other lead to pin 2 of V-8.

☑ 1" piece of the small bare wire. Solder one end to pin 8 of V-8. Connect the other end to pin 2 of V-8.

☑ Orange wire. Connect one end to pin 7 of V-8. Solder the other end to pin 7 of V-7 (2 wires).

☑ Yellow wire. Solder one end to pin 1 of V-8. Connect the other end to pin 1 of V-7.

☑ Yellow wire. Connect one end to pin 3 of V-8. Connect the other end to pin 3 of V-7.

☑ 1" piece of the small bare wire. Solder one end to pin 8 of V-7. Connect the other end to pin 2 of V-7.

☑ C-26, .005 μf disc capacitor. Position the capacitor in the center of tube socket V-7 as shown. Solder one lead to pin 4 of V-7. Connect the other lead to pin 2 of V-7.

☐ C-24, .005 μf disc capacitor. Connect one lead to terminal 2 of TS-3. Connect the other lead to terminal 3 of TS-3.

☑ R-11, 560Ω, 5% resistor (green, blue, brown, gold). Solder one lead to terminal 2 of TS-3 (2 wires). Connect the other lead to terminal 3 of TS-3.

☑ Orange wire. Solder one end to terminal 1 of R-32. Connect the other lead to terminal 6 of TS-2.

☑ Go back and check the wiring for poor solder joints and proper connections before continuing.

PREWIRING S-2

SEE FIGURE 12.

☐ S-2, the 4-wafer switch. Position the switch with the locating tab as shown in Figure 12.

☑ Cut a 1¼" piece of the small bare wire. Solder one end to terminal 2 of S-2A. Insert the other end through terminal 3 of S-2A and connect to terminal 4 of S-2A. Solder terminal 3 of S-2A.

☐ L-6, coil (marked with a violet dot) and R-40, 4.7K resistor (yellow, violet, red). Wrap the leads of R-40 around the leads of L-6 as close to the coil form as possible. Clip the excess and solder the leads of R-40 to those of L-6 as shown in Figure 12.

☑ L-6 and R-40. Cut one of the leads from L-6 to ¾" long. Solder this lead to terminal 1 of S-2A. The other lead from the two components will be connected later.

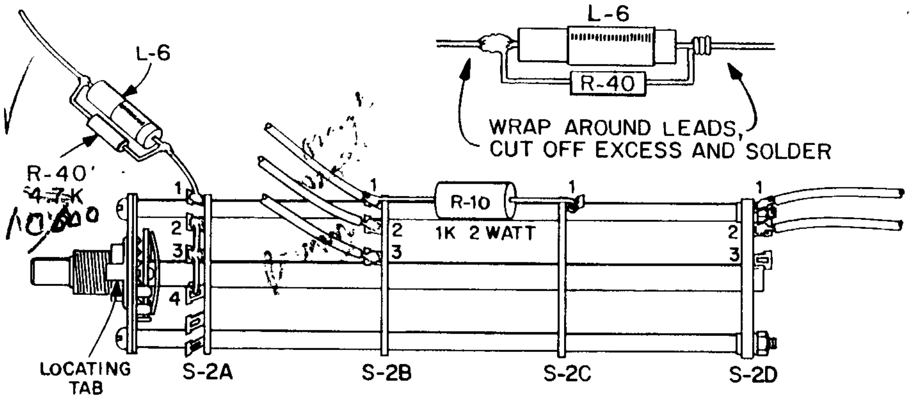


FIGURE 12. PREWIRING S-2

☑ R-10, 1K, 2 watt resistor (brown, black, red). Connect one lead to terminal 1 of S-2B. Connect the other lead to terminal 1 of S-2C.

☑ Orange wire. Solder one end to terminal 1 of S-2B (2 wires). The other end will be connected later.

☑ Violet wire. Solder one end to terminal 2 of S-2B. The other end will be connected later.

☐ Brown wire. Solder one end to terminal 3 of S-2B. The other end will be connected later.

☑ 3½" heavy bare wire. Solder one end to terminal 1 of S-2D. The other end will be connected later.

☑ Yellow wire. Solder one end to terminal 2 of S-2D. The other end will be connected later.

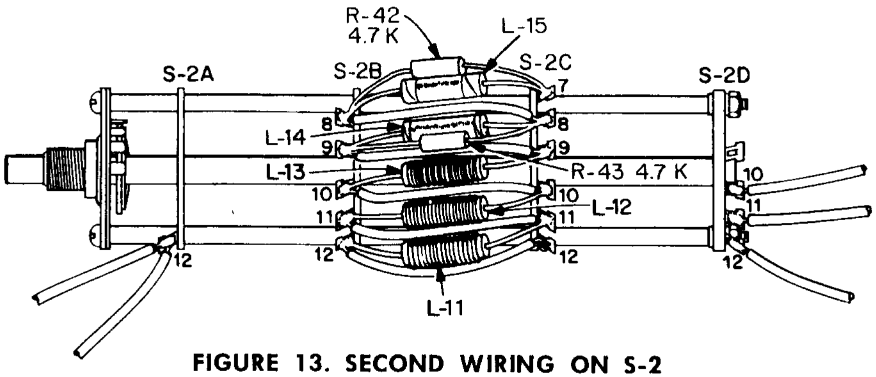


FIGURE 13. SECOND WIRING ON S-2

SECOND WIRING ON S-2

SEE FIGURE 13.

☑ Position the switch with the terminals as shown.

☑ Red wire. Connect one end to terminal 12 of S-2A. The other end will be connected later.

☑ Orange wire. Solder one end to terminal 12 of S-2A (2 wires). The other end will be connected later.

☐ R-42, 4.7K resistor (yellow, violet, red). Connect one lead to terminal 7 of S-2C. Connect the other lead to terminal 8 of S-2B.

☒ L-15, coil (marked with a red dot). Solder one lead to terminal 7 of S-2C (2 wires). Connect the other lead to terminal 8 of S-2B.

☑ Red wire. Solder one end to terminal 8 of S-2B (3 wires). Connect the other end to terminal 8 of S-2C.

☑ R-43, 4.7K resistor (yellow, violet, red). Connect one lead to terminal 8 of S-2C. Connect the other lead to terminal 9 of S-2B.

☑ L-14, (marked with a yellow dot). Solder one lead to terminal 8 of S-2C (3 wires). Connect the other lead to terminal 9 of S-2B.

☑ Red wire. Solder one end to terminal 9 of S-2B (3 wires). Connect the other end to terminal 9 of S-2C.

☑ L-13, coil (marked with a blue dot). Solder one lead to terminal 9 of S-2C (2 wires). Connect the other lead to terminal 10 of S-2B.

☐ Red wire. Solder one end to terminal 10 of S-2B (2 wires). Connect the other end to terminal 10 of S-2C.

☐ L-12, coil (marked with a green dot). Solder one lead to terminal 10 of S-2C (2 wires). Connect the other lead to terminal 11 of S-2B.

☐ Red wire. Solder one end to terminal 11 of S-2B (2 wires). Connect the other end to terminal 11 of S-2C.

☐ L-11, coil (marked with an orange dot). Solder one lead to terminal 11 of S-2C (2 wires). Connect the other lead to terminal 12 of S-2B.

☐ Red wire. Connect one end to terminal 12 of S-2C. Solder the other end to terminal 12 of S-2B (2 wires).

☐ Yellow wire. Solder one end to terminal 10 of S-2D. The other end with be connected later.

☑ Orange wire. Solder one end to terminal 11 of S-2D. The other end with be connected later.

☑ **Small red-white stranded wire.** Solder one end to terminal 12 of S-2D. The other end will be connected later.

SECOND WIRING ON THE BOTTOM OF THE CHASSIS

SEE FIGURE 14.

☑ S-2, the prewired band switch. Mount by inserting the locating tab in the hole in the chassis. Fasten with a 3/8″ nut. Connect the wires from S-2 as follows:

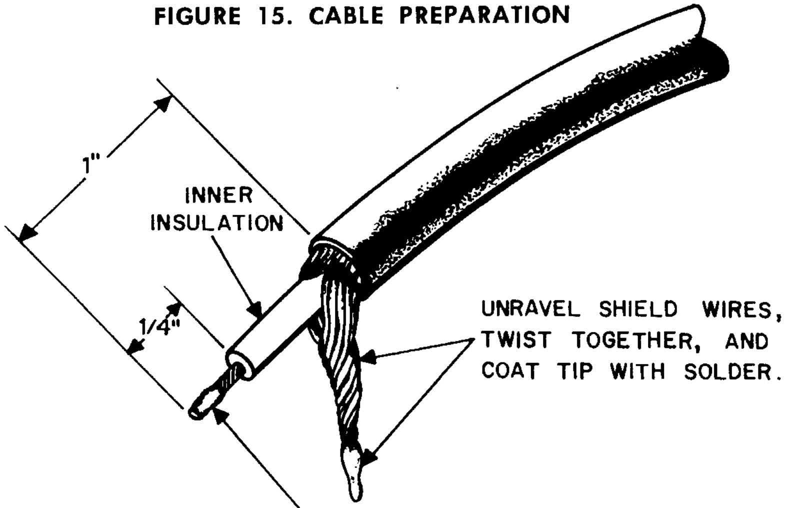
- ☑ Heavy bare wire from terminal 1 of S-2D. Place the 3″ piece of large smooth, rubber-like tubing over the wire. Insert the free end through the grommet shown.
- ☑ L-6, coil (with R-40) connected to S-2A. Connect the free lead to terminal 1 of TS-9.
- ☑ Orange wire from S-2B. Connect the free end to terminal 4 of TS-9.
- ☑ Brown wire from S-2B. Connect the free end to terminal 2 of TS-6.
- ☑ Violet wire from S-2B. Solder the free end to terminal 2 of TS-16 (4 wires).
- ☑ Yellow wire from terminal 2 of S-2D. Place a 3¼″ piece of large fiberglass tubing over the wire. Insert the free end through the grommet shown.
- ☑ Red-white wire connected to terminal 12 of S-2D. Place a 3½″ piece of large fiberglass tubing over the wire. Insert the free end through the grommet shown.
- ☐ Orange wire connected to terminal 11 of S-2D. Place a 2½″ piece of large fiberglass tubing over the wire. Insert the free end through the grommet shown.

☑ Front panel. Mount the front panel to the chassis by placing the panel over the shafts of the controls and fastening with six 3/8″ nuts on the shafts of the control. A 3/8″ flat washer mounts under the nut on J-4.

☑ Support brackets. Mount to the rear of the chassis with 4 self-tapping screws.

☑ L-10, large coil with five windings. Solder the short lead to terminal 12 of S-2C (2 wires). Solder the other lead to terminals 1 and 2 of C-21.

FIGURE 15. CABLE PREPARATION


1"
INNER INSULATION
1/4"
UNRAVEL SHIELD WIRES, TWIST TOGETHER, AND COAT TIP WITH SOLDER.
COAT INNER CONDUCTOR TIP WITH SOLDER.

SEE FIGURE 14.

☑ L-24, the small parasitic suppressor. Note that there are two large and one small resistor wrapped with several turns of wire. These are the parasitic suppressors. The small one, wound on a ½ watt resistor, is L-24. Solder one lead to pin 7 of V-3. Solder the other lead to the lead from L-10.

☑ C-19, .005 μf disc capacitor. Solder one lead to ground lug A of V-3 (3 wires). Connect the other lead to terminal 1 of TS-10.

☑ R-7, ~~100K~~ 39K resistor (~~brown, black, yellow~~ ORANGE WH ORANGE). Connect one end to pin 2 of V-3. Connect the other lead to terminal 1 of TS-10.

☑ Red wire from S-2A. Solder the free end to terminal 2 of C-16 (2 wires).

☑ Orange wire from S-2A. Connect the free end to terminal 2 of TS-10.

☑ C-17, .005 μf disc capacitor. Solder one lead to pin 2 of V-3 (2 wires). Solder the other lead to terminal 2 of TS-10 (2 wires).

☑ R-8, 560Ω, 5% resistor (green, blue, brown, gold). Solder one lead to terminal 1 of TS-10 (4 wires). Solder the other lead to terminal 3 of TS-10.

☑ C-53, .005 μf disc capacitor. Solder one lead to pin 9 of V-4 (3 wires). Connect the other end to ground lug A of V-4.

☑ 4" piece of shielded cable. Prepare the ends as shown in Figure 15. Solder the inner conductor of one end to pin 2 of V-4. Solder the shield wire to ground lug A of V-4 (2 wires). Connect the inner conductor of the other end to terminal 2 of TS-11. Connect the shield wire to terminal 1 of TS-11.

☑ 1½" piece of the small bare wire. Insert the wire through pins 5, 4 and 3 of V-4 and solder to ground lug B of V-4. Solder pins 3, 4 and 5.

☑ R-25, 1.5K resistor (brown, green, red). Connect one lead to pin 8 of V-4. Connect the other lead to terminal 3 of R-23.

☑ Line cord. Insert the line cord through the grommet shown. Tie a knot in the cord 4" from the end. Split the two wires back 1" from the end. Solder either one of the wires to terminal 1 of the fuse holder. Solder the other wire to terminal 1 of TS-4 (3 wires).

☑ C-28, .001 μf disc capacitor. Connect one lead to pin 3 of V-8. Connect the other lead to the solder lug mounted at the end of the socket.

☑ C-30, .005 μf disc capacitor. Position the capacitor in the center of tube socket V-8 as shown. Insert one lead through pin 2 of V-8 and ~~solder to the~~ solder lug (2 wires). Solder pin 2 of V-8 (4 wires). Solder the other lead to pin 6 of V-8.

☑ C-25, .005 μf disc capacitor. Position the capacitor in the center of tube socket V-7 as shown. Solder one lead to pin 6 of V-7. Insert the other lead through pin 2 of V-7 and solder to the solder lug.

☑ C-27, .001 μf disc capacitor. Solder one lead to pin 3 of V-7 (2 wires). Solder the other lead to pin 2 of V-7 (5 wires).

☑ Blue wire. Solder one end to pin 1 of V-7 (2 wires). Solder the other end to terminal 4 of TS-10 (3 wires).

☑ R-12, 22K 2 watt resistor (red, red, orange). Connect one lead to terminal 1 of TS-3. Connect the other lead to terminal 3 of TS-3.

☑ Violet wire. Solder one end to terminal 3 of TS-3 (4 wires). Solder the other end to terminal 8 of S-4.

5 (11) ☐ L-7, coil (marked with a gray dot) and R-41, ~~4.7K~~ 10,000 resistor (~~yellow, violet~~ Br Bk org). Solder R-41 across L-7 in the same manner R-40 was mounted to L-6 (See Figure 12). Solder one lead from L-7 to terminal 4 of S-2A (2 wires). Connect the other lead to terminal 1 of TS-9.

☐ L-8, black dot coil. Solder one lead to terminal 5 of S-2A. Connect the other lead to terminal 1 of TS-9.

☑ L-9, white dot coil. Solder one lead to terminal 6 of S-2A. Connect the other lead to terminal 1 of TS-9.

☑ C-22, 330 μμf mica capacitor. Solder one lead to terminal 3 of TS-8. Connect the other lead to terminal 1 of S-2C.

☑ Green wire. Solder one end to terminal 1 of S-2C (3 wires). Place a 4¼" piece of large tubing over the wire. Insert the other end through the grommet shown. ok

☑ TS-14, 3-terminal strip. Mount TS-14 in the remaining mounting hole of J-7. Use a 4-40 x ¼" screw, lockwasher and nut.

☑ Tubing covered yellow wire from J-7. Solder the free end to terminal 9 of S-2D.

☑ R-17, the 4.7K resistor from J-7. Connect the free lead to terminal 1 of TS-14.

☑ R-18, 1.5K resistor (brown, green, red). Connect one lead to terminal 1 of TS-14. Connect the other lead to terminal 2 of TS-14.

☑ Green-white wire. Connect one end to terminal 3 of TS-14. Route the wire as shown and insert the other end through the cutout in the chassis.

☑ Violet wire. Solder one end to terminal 8 of J-2 (2 wires). Solder the other end to terminal 2 of C-48 (2 wires).

☑ R-39, 8.2K, 2 watt resistor (gray, red, red). Solder one lead to terminal 3 of J-1. Connect the other lead to terminal 4 of J-1.

☑ Gray wire. Solder one end to terminal 4 of J-1 (2 wires). Solder the other end to pin 3 of V-8. (3 wires).

☑ Green-white wire. Solder one end to terminal 1 of TS-6 (3 wires). Connect the other end to terminal 1 of TS-1.

☑ C-50, .02 μf disc capacitor. Solder one lead to pin 6 of V-1 (2 wires). Solder the other lead to ground lug C of V-1 (2 wires).

☑ C-9, .005 μf disc capacitor. Connect one lead to pin 8 of V-1. Solder the other lead to ground lug A of V-1 (2 wires).

☑ R-2, 1.5K resistor (brown, green, red). Slip a ¾″ piece of small tubing over one lead of R-2 and solder this lead to pin 8 of V-1 (2 wires). Connect the other lead to terminal 3 of TS-15.

☑ Yellow wire. Connect one end to pin 2 of V-1. Solder the other end to terminal 6 of S-3B.

ST ⑪ ☑ C-10, 750 μμf ~~tubular~~ MICA capacitor. ODD SHAPE Slip a ⅜″ piece of small tubing over each lead of C-10. Solder one lead to pin 2 of V-1 (3 wires). Connect the other lead to pin 1 of V-1.

☑ R-5, 39K resistor (orange, white, orange). Solder one lead to pin 3 of V-2. Solder the other lead to terminal 1 of TS-8 (2 wires).

☑ R-4, 1K, 1 watt resistor (brown, black, red). Connect one lead to terminal 4 of TS-9. Solder the other lead to terminal 1 of TS-9 (6 wires).

☐ Blue wire. Solder one end to terminal 4 of TS-9 (6 wires). Solder the other end to pin 9 of V-3 (2 wires).

☐ Yellow wire connected to terminal 10 of S-2D. Place a 3½″ piece of large tubing over the wire. Insert the free end through the grommet shown.

☑ Two pin jacks. Mount each jack with a nut as shown in Figure 16.

☑ Gray wire. Solder one end to J-6. The other end will be connected later.

☐ Violet wire. Solder one end to J-5. The other end will be connected later.

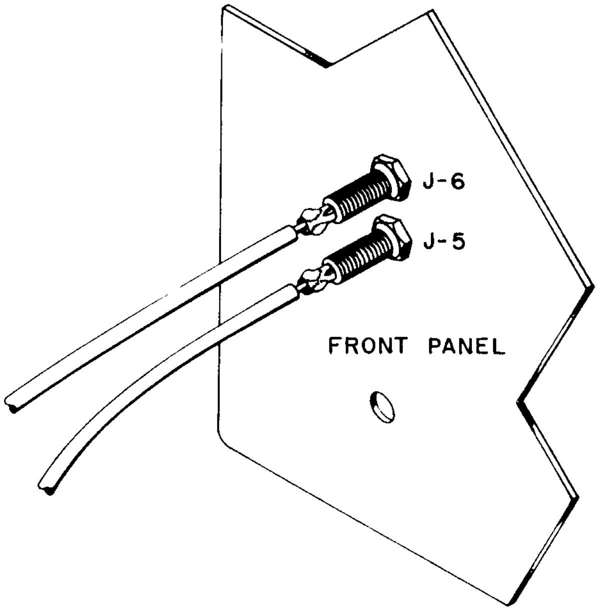


FIGURE 16. PIN JACK MOUNTING

☑ Gray wire from J-6. Connect the free end to terminal 2 of TS-9.

☑ Violet wire from J-5. Solder the free end to terminal 8 of S-3B.

☐ C-38, .02 μf disc capacitor. Conncct one lead to terminal 3 of J-4. Connect the other lead to terminal 1 of J-4.

☐ R-21, 2.2K, 2 watt resistor (red, red, red). Solder one lead to terminal 3 of J-4 (3 wires). Connect the other lead to terminal 1 of J-4.

☐ 12″ red-white wire. Solder one end to terminal 2 of J-4. Solder the other end to terminal 4 of J-2.

☐ Red wire. Solder one end to pin 7 of V-4. Solder the other end to terminal 2 of R-23.

☑ Red wire. Solder one end to ground lug C of V-4. Solder the other end to terminal 3 of R-23 (2 wires).

☑ Red wire. Solder one end to pin 1 of V-5. Connect the other end to terminal 1 of TS-1.

☑ C-43, .1 μf tubular capacitor. Connect the end marked with a band to pin 9 of V-5. Connect the other lead to terminal 5 of TS-1.

☑ J-3, microphone jack. Remove the nut from the jack. Mount the jack with a 3/8″ lockwasher and nut. Discard the washers and solder lug, they are not mounted with the jack.

☑ R-19, 4.7K resistor (yellow, violet, red). Insert the resistor in the jack as shown. Solder the lead of the resistor to the front of the jack. Cut off any of the surplus lead length. Connect the other lead to terminal 2 of TS-11.

PREWIRING THE TUNING CHASSIS

SEE FIGURE 17.

☑ Tuning chassis, tuning sub-chassis and a #6 solder lug. Assemble with six 6-32 x 1/4″ screws, lockwashers and nuts as shown in Figure 18. See Figure 17 for location of the solder lug.

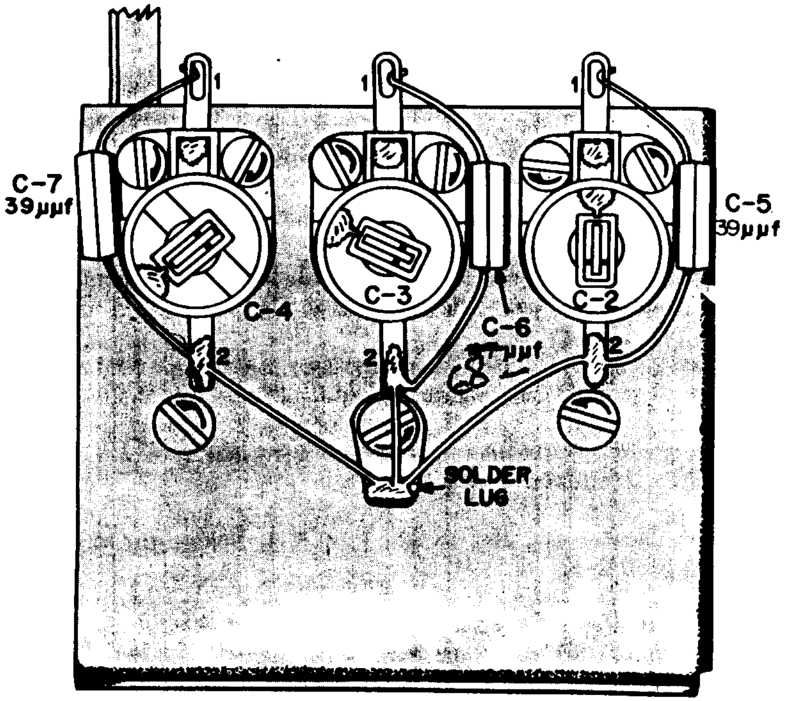


FIGURE 17. FIRST WIRING ON THE TUNING CHASSIS

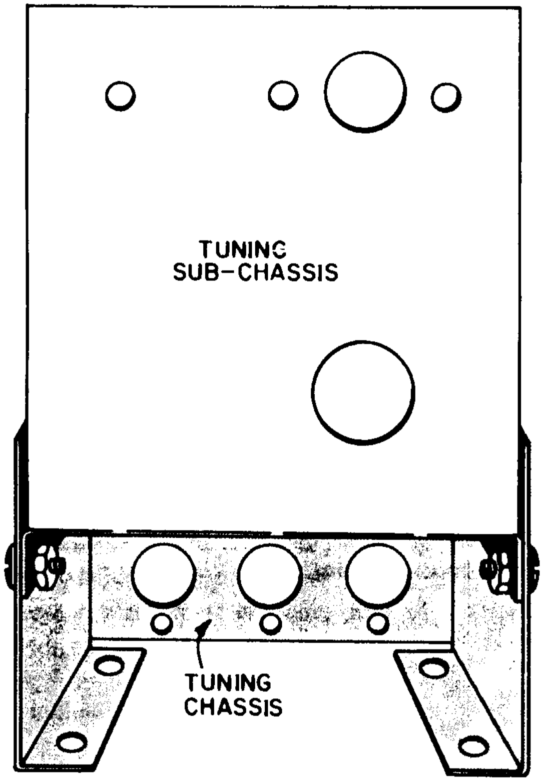


FIGURE 18. TUNING CHASSIS ASSEMBLY

☑ C-2, C-3 and C-4, three trimmer capacitors. Mount each with two 4-40 x 3/8″ screws, lockwashers and nuts.

1. ☐ C-7, 39 μμf mica capacitor. Connect one lead to terminal 1 of C-4. Connect the other lead to terminal 2 of C-4.

☑ C-6, ~~47~~ 68 MMF μμf mica capacitor. Connect one lead to terminal 1 of C-3. Insert the other lead through terminal 2 of C-3 and connect to the solder lug. Solder terminal 2 of C-3.

☐ C-5, 39 μμf mica capacitor. Connect one lead to terminal 1 of C-2. Connect the other lead to terminal 2 of C-2.

☑ Cut a 1 1/4″ piece of the small bare wire. Solder one end to terminal 2 of C-2 (2 wires). Connect the other end to the solder lug.

☑ Cut a 1 1/4″ piece of the small bare wire. Solder one end to terminal 2 of C-4 (2 wires). Solder the other end to the solder lug (3 wires).

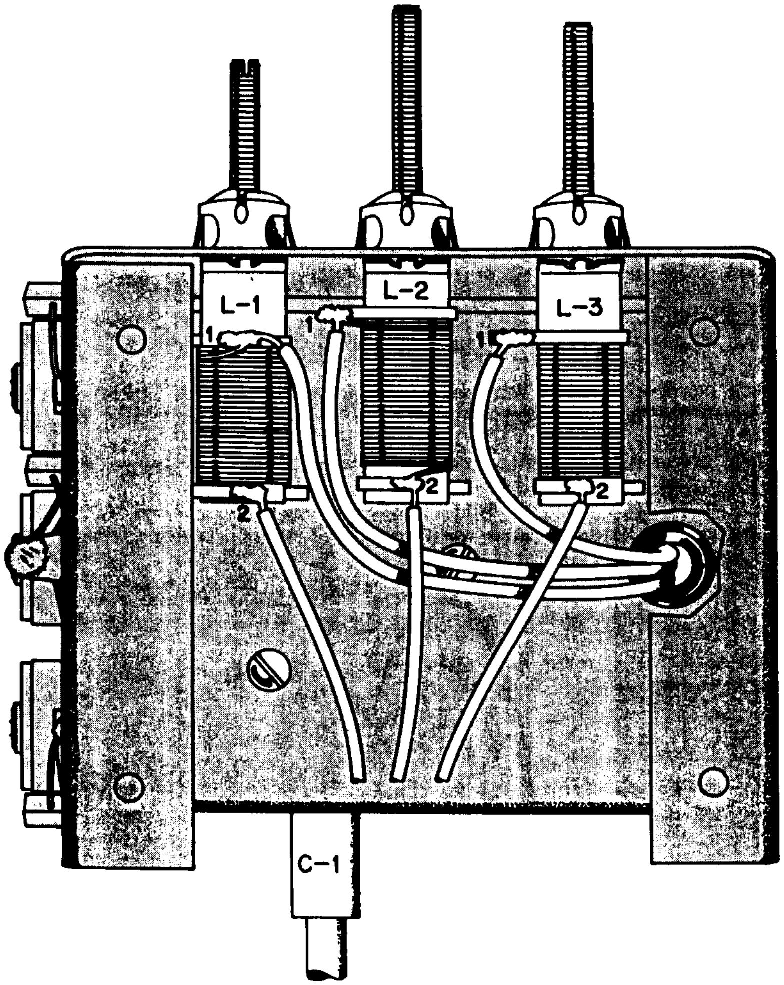


FIGURE 19. SECOND WIRING ON THE TUNING CHASSIS

SECOND WIRING ON THE TUNING CHASSIS

SEE FIGURE 19.

☑ Small grommet. Insert in the hole shown.

☑ C-1, 3-section variable capacitor (part #286055). Insert the shaft of the capacitor through the hole in the tuning sub-chassis. Mount with three 6-32 x ¼" screws and lockwashers. See Figure 21 for a top view of C-1.

Continue Check

Mount the following coils as shown in Figure 20.

4 ☑ L-1, orange dot coil.

6 ☑ L-2, yellow dot coil. WITH C60 ATTACHED

8 ☑ L-3, red dot coil. WITH C61 ATTACHED

4 ☑ Orange wire. Solder one end to terminal 1 of L-3. Insert the other end through the grommet shown, it will be connected later. (2 WIRES)

5 ☑ Yellow wire. Solder one end to terminal 1 of L-2. Insert the other end through the grommet shown, it will be connected later. (2 WIRES)

2 [illegible]

☑ Green wire. Solder one end to terminal 1 of L-1. Insert the other end through the grommet shown, it will be connected later.

☑ Violet wire. Solder one end to terminal 2 of L-1. The other end will be connected later.

8 ☑ Blue wire. Solder one end to terminal 2 of L-2. The other end will be connected later. (2 WIRES)

9 ☑ Green wire. Solder one end to terminal 2 of L-3. The other end will be connected later. (2 WIRES)

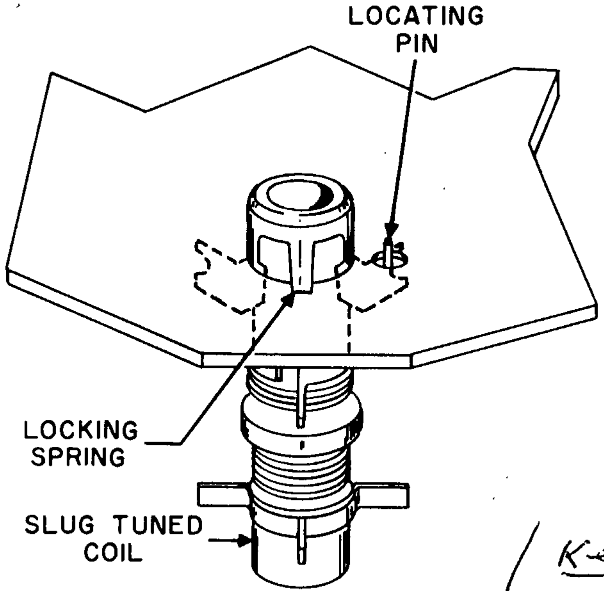


FIGURE 20. COIL MOUNTING

KEEP LEADS SHORT

C60 – 15MMF DISC CAP, & L2 COIL MARKED WITH A YELLOW DOT. CONNECT ONE LEAD OF C-60 TO TERMINAL 1 OF L2 CONNECT OTHER END TO TERMINAL 2 OF L2.

[illegible]

TO TERMINAL 1 OF L3, CONNECT THE OTHER END TO TERMINAL 2 OF L3, KEEP LEADS SHORT.

FIRST WIRING ON THE TOP

SEE FIGURE 21. NOTE ONE CORNER OF DIAL CRYSTAL HAS NOTCHED, POSITION CRYSTAL CORNER (AS SHOWN IN FIG 22 SO CORNER IS NEAREST FRONT PANEL

(ST1)

☑ Plastic plate. Remove the protective backing. Mount to the panel with two 4-40 x 1/4" screws, lockwashers and nuts.

☐ Dial, threaded collar, setscrew, 1/2" lockwasher and nut. Assemble as shown in Figure 22.

☑ Dial assembly. Place over the shaft of C-1, the variable capacitor mounted on the tuning chassis.

☑ TS-15 mounting hardware. Remove the hardware mounting TS-15 to the chassis. One of the screws used in the next step will remount TS-15 to the chassis.

☑ Position the tuning chassis on the main chassis with the shaft of C-1 through the hole in the plastic plate. Mount the tuning chassis with four self-tapping screws (one re-mounts TS-15). Insert the wires from the tuning chassis through the grommet.

☑ Close the blades of C-1 all the way. Fasten the dial scale to the shaft of C-1 with the setscrew. With the blades closed all the way the hairline on the window should be on the white line on the scale.

☑ TS-13, 2-terminal strip. Mount with a 6-32 x 1/4" screw, lockwasher and nut.

☐ Orange wire from the grommet in the tuning chassis. Solder the free end to terminal 4 of C-1.

☑ Yellow wire from the grommet in the tuning chassis. Solder the free end to terminal 5 of C-1.

☑ Green wire from the grommet in the tuning chassis. Solder the free end to terminal 6 of C-1.

☑ Cut three 1" pieces of the small bare wire. Connect these wires as follows:

- ☑ Bare wire. Solder one end to terminal 1 of C-1. Solder the other end to terminal 1 of C-4 (2 wires).
- ☑ Bare wire. Solder one end to terminal 2 of C-1. Solder the other end to terminal 1 of C-3 (2 wires).
- ☑ Bare wire. Solder one end to terminal 3 of C-1. Solder the other end to terminal 1 of C-2 (2 wires).

☑ Pilot light socket and bulb. Insert the pilot light in the socket. Mount the socket to the tuning chassis.

NOTE: The pilot light leads may be shortened for neater connections.

☐ Connect either of the pilot light leads to terminal 2 of TS-13. Connect the other lead to terminal 1 of TS-13.

☑ C-55, .02 μf disc capacitor. Solder one lead to terminal 1 of TS-13 (2 wires). Connect the other lead to terminal 2 of TS-13.

☐ Brown wire. Solder one lead to terminal 2 of TS-13 (3 wires). Insert the other end through the grommet.

COIL #1 — 5-#8 SOLDER LUGS & 6-32 x 1/4" SCREW & A LOCKWASHER, USE SCREW & LOCK WASHER TO FASTEN SOL. LUGS TO TOP OF SPACER IN CENTER OF CHASSIS.

☑ Top shield. Fasten the top shield in place with two 6-32 x 3/16" screws and lockwashers. Fasten to the angle clips.

☑ L-20, the large coil and ~~four~~ 3 #8 solder lugs EACH. Bend the solder lugs around the coil windings and solder in place as shown in Figure 23.

THE SOLDER LUG IN MIDDLE IS CONNECTED TO TERMINAL [illegible]

☑ Mount L-20 to the two spacers by bending one of the solder lugs on each spacer over the coil leads. Solder the coil to the solder lugs.

☑ Tubing covered bare wire from the grommet near the back of the chassis. Connect the free end to solder lug #6 of L-20.

☑ Tubing covered yellow wire from the large grommet. Solder the free end to solder lug #5 of L-20.

☑ Tubing covered orange wire from the large grommet. Solder the free end to solder lug #4 of L-20.

☑ Tubing covered red-white stranded wire from the large grommet. Solder the free end to solder lug #3 of L-20.

☒ Tubing covered heavy bare wire from the large grommet. Solder the free end to solder lug ~~#2~~ of L-20. SOLDER FREE END TO DOUBLE SOL LUGS AS IN FIG (21)

NO

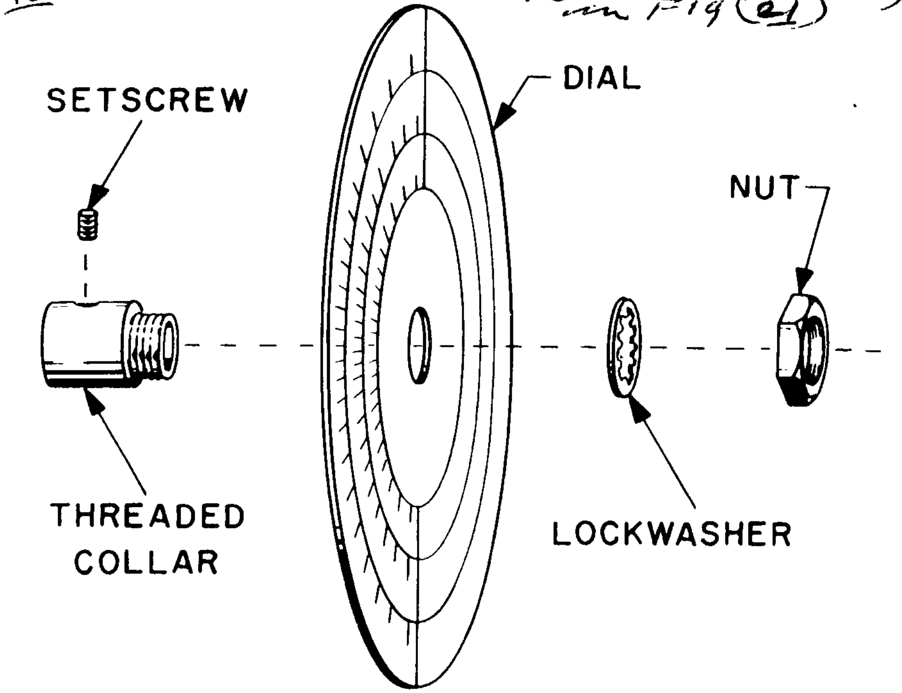


FIGURE 22. DIAL SCALE ASSEMBLY

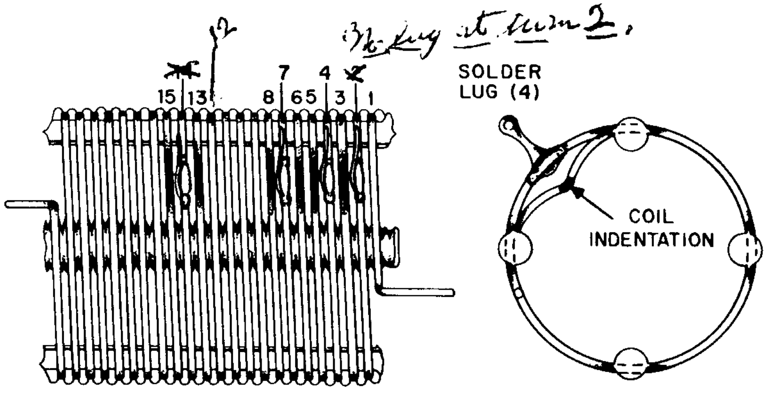


FIGURE 23. L-20 PREPARATION

☑ Tubing covered green wire from the ~~large~~ SMALL grommet. Connect the free end to terminal 1 of TS-12.

☑ Two orange wires. Solder one end of each wire to terminal 1 of TS-12 (3 wires). Bend the ends of the wires around the tube sockets at a height of ~~¼~~" 1 inch above the chassis. The free ends of these wires WILL NOT BE CONNECTED ANYWHERE, but will be used to neutralize the output tubes. Cut off the bare portion of the wires at the free ends. for more accurate neutralization,

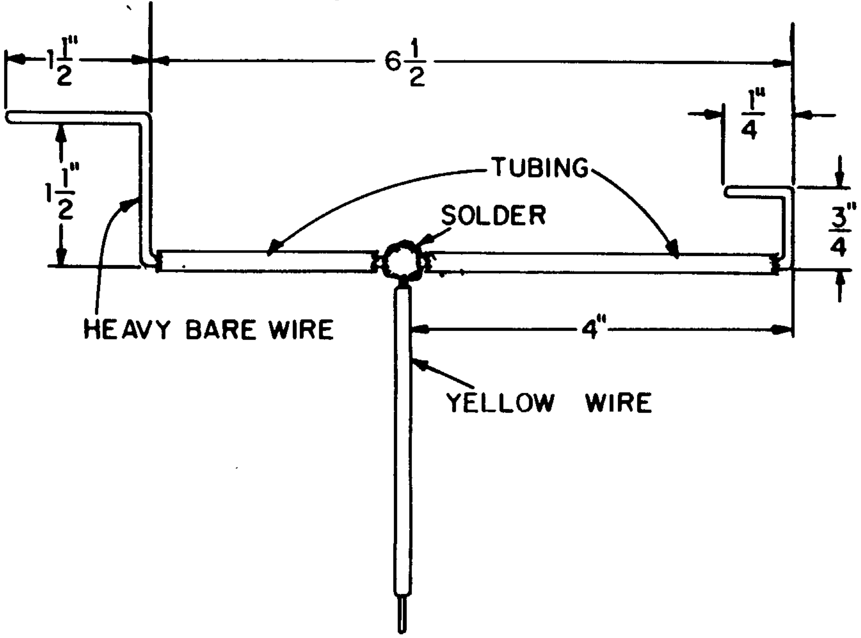


FIGURE 24. BUSBAR ASSEMBLY

☐ ~~Tubing covered yellow wire from the remaining grommet. Connect the free end to solder lug #1 of L-20.~~ DeLeTe;

☑ Cut an 11" piece of the large bare wire and two pieces of the large tubing; one 2" and one 4". Slide the two pieces over the large bare wire. Form the wire as shown in Figure 24. Solder a yellow wire to the bare wire as shown.

☑ Solder the end of the bare wire that is closest to the yellow wire to terminals 1 and 2 of C-35. Route the busbar under L-20 and solder the other end to solder lug #6 of L-20 (2 wires).

☑ Place a 3½" piece of the large tubing over the yellow wire connected to the busbar. Insert the free end through the grommet shown.

Step 5A ☐ ~~L-19, the large coil with three windings.~~ ~~Solder the long lead to terminals 1 and 2 of C-32. Solder the short lead to solder lug #1 of L-20 (2 wires).~~ THE TAPPed COIL MADE OF HEAVY WIRE, SOLDER Long Lead TO TERMINALS 1 & 2 OF C 32 SOLDER SHORT Lead TO DOUBLE SOL LUG AS IN REVISED FIG 21

5A Step Tubing covered yellow wire from small grommet. Sol free end of wire to coil TAP of L19 AS in Revised Fig 21,

☑ C-31, .005 μf, **1000 volts (marked 1KV)** disc capacitor. Connect one lead to the terminal of L-18. Solder the other lead to L-19 where shown.

NOTE: The two parasitic chokes are identical.

☑ L-16, parasitic choke (coil wound on a 2 watt resistor). Cut one lead so it is ½" long. Solder this lead to a plate clip as shown in Figure 25. Cut the other lead so it is 1" long. Connect this lead to the terminal of L-18. The plate clip will be connected later.

☑ L-17, the other parasitic choke. Cut one lead so it is 1" long. Solder this lead to a plate clip. Cut the other lead so it is 1½" long. Solder this lead to the terminal of L-18 (3 wires). The plate clip will be connected later.

☑ Meter. Remove the jumper wire from the two terminals. Mount the meter to the panel with four 4-40 nuts and split washers. The hardware used to mount the meter is packed in the box with the meter. Mount a #10 solder lug to each meter terminal with a 10-32 flat washer and nut.

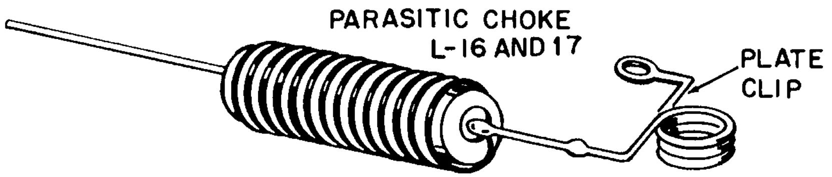


FIGURE 25. CHOKE PREPARATION

☐ Cut a ¾″ piece of the small bare wire. Connect one end to terminal 1 of S-4. Connect the other end to terminal 2 of S-4.

☑ Cut a 1¼″ piece of the small bare wire. Place a ¾″ piece of small tubing over the wire. Solder one end to terminal 2 of S-4 (2 wires). Solder the other end to terminal 4 of S-4.

☑ Orange wire from the cutout in the chassis. Solder the free end to terminal 1 of S-4 (2 wires).

☑ White wire from the cutout in the chassis. Solder the free end to terminal 3 of S-4.

☑ Green wire from terminal 11 of S-4. Connect the free end to terminal 2 of the meter.

☑ Yellow wire from terminal 10 of S-4. Connect the free end to terminal 2 of R-16.

☑ C-34, .005 μf disc capacitor. Solder one lead to terminal 2 of R-16 (2 wires). Connect the other lead to terminal 1 of R-16.

☑ Red-white wire from the cutout in the chassis. Solder the free end to terminal 1 of R-16 (2 wires).

☑ Green-white wire from the cutout in the chassis. Solder the free end to terminal 3 of R-16.

☑ Yellow wire. Solder one end to terminal 5 of S-4. Connect the other end to terminal 1 of the meter.

☑ C-37, .005 μf disc capacitor. Solder one lead to terminal 1 of the meter (2 wires). Solder the other lead to terminal 2 of the meter (2 wires).

FINAL WIRING ON THE CHASSIS

SEE FIGURE 26.

☑ Green wire from the grommet near S-3. Solder the free end to terminal 3 of S-3B.

☑ Blue wire from the grommet near S-3. Solder the free end to terminal 4 of S-3B.

☑ Violet wire from the grommet near S-3. Solder the free end to terminal 5 of S-3B.

☑ Brown wire from the grommet near S-3. Connect the free end to terminal 1 of TS-7.

☑ Green wire. Solder one end to terminal 1 of TS-7 (4 wires). Connect the other end to terminal 2 of J-2.

☑ Red wire. Solder one end to terminal 6 of S-1B. Solder the other end to terminal 1 of S-1C (2 wires).

☑ 12″ red-white wire. Solder one end to terminal 5 of S-1B. Solder the other end to terminal 6 of J-2.

☑ White wire. Solder one end to terminal 5 of S-1A. Solder the other end to terminal 2 of TS-6 (3 wires).

☑ Brown-white wire. Solder one end to terminal 6 of S-1A. Solder the other end to terminal 2 of J-1.

☑ Violet wire. Solder one end to terminal 7 of J-1. Solder the other end to terminal 2 of TS-8 (3 wires).

☑ Blue wire. Solder one end to terminal 5 of J-2. Solder the other end to terminal 2 of TS-5 (3 wires).

☑ Green wire. Connect one end to terminal 2 of J-2. Solder the other end to pin 7 of V-8 (2 wires).

☑ Blue wire. Solder one end to terminal 2 of J-2 (3 wires). Solder the other end to pin 5 of V-2 (2 wires).

☑ C-13, .001 μf disc capacitor. Solder one lead to pin 8 of V-2. Solder the other lead to terminal 2 of TS-9 (2 wires).

☐ R-3, 100K resistor (brown, black, yellow). Solder one lead to pin 9 of V-2. Solder the other lead to terminal 3 of TS-9.

☑ C-11, 750 $\mu\mu$f mica capacitor. Connect one lead to pin 1 of V-1. Solder the other lead to ground lug B of V-1. (2 wires).

NOTE: Coils L-4 and L-5 are identical.

☐ L-5. Solder one lead to pin 1 of V-1 (3 wires). Connect the other lead to terminal 1 of TS-15.

☑ Green wire. Solder one end to terminal 1 of J-4 (4 wires). Solder the other end to terminal 1 of TS-15 (2 wires).

☑ L-4. Solder one lead to pin 7 of V-1 (2 wires). Connect the other lead to terminal 3 of TS-15.

☑ C-59, .005 μf disc capacitor. Solder lead end to terminal 3 of TS-15 (4 wires). Solder the other lead to terminal 2 of TS-15.

☑ C-36, .005 μf disc capacitor. Solder one lead to terminal 2 of TS-14 (2 wires). Connect the other lead to terminal 3 of TS-14.

NOTE: There are three diodes used in the transmitter. CR-1 and CR-2, the rectifiers are identical. CR-3 the meter rectifier is different in shape than CR-1 and CR-2. The marked ends of the diodes may be marked with a band, a dot, several colored bands or have the end colored red. When wiring the diodes be sure to position the marked end exactly as instructed.

☑ CR-3, meter rectifier. Solder the marked end to terminal 1 of TS-14 (3 wires). Solder the other lead to terminal 3 of TS-14 (3 wires).

[illegible] 2 SOLDER LUGS & 6-32 x 1/4" SCREW & A LOCKWASHER

☑ CR-2, rectifier. Solder the marked end to terminal 1 of TS-2 (2 wires). Solder the other end to terminal 3 of TS-2.

☑ CR-1, rectifier. Solder the marked end to terminal 6 of TS-2 (2 wires). Solder the other lead to the hole in the mounting foot of TS-2.

☑ R-14, 10Ω resistor (brown, black, black). Place a ¾″ piece of small tubing over one lead. Solder this lead to pin 5 of V-8. Connect the other lead to terminal 1 of TS-3.

☑ R-13, 10Ω resistor (brown, black, black). Solder one lead to pin 5 of V-7. Connect the other lead to terminal 1 of TS-3.

(5) ☑ C-23, 1000 μμf mica capacitor. Solder one lead to terminal 1 of TS-3 (4 wires). Solder the other lead to the coil ~~as shown~~. L 10 ONE FULL TURN FROM END OF COIL THAT IS CONNECTED TO SWITCH S2 NOT AS ILLUSTRATED IN FIG 26.

THE CORRECT POINT ON L-10 IS DIRECTLY OPPOSITE PIN 8 OF V-7 WHEN COIL IS POSITIONED AS SHOWN IN FIG 26. THIS WILL GIVE INCREASED GRID DRIVE ON 6 METERS.

☐ Tubing covered yellow wire from the grommet near S-2. Solder the free end to terminal 3 of S-2D.

☑ R-26, 270K resistor (red, violet, yellow). Solder one lead to terminal 1 of TS-1 (5 wires). Connect the other lead to terminal 4 of TS-1.

☑ R-27, 10 meg resistor (brown, black, blue). Connect one lead to terminal 2 of TS-1. Connect the other lead to pin 7 of V-5.

☑ C-42, .001 μf disc capacitor. Place a 1″ piece of small tubing over one lead. Solder this lead to pin 7 of V-5 (2 wires). Connect the other lead to pin 6 of V-4.

☑ R-31, 47K, 1 watt resistor (yellow, violet, orange.) Solder one lead to terminal 2 of TS-1 (3 wires). Connect the other lead to terminal 5 of TS-1.

☑ R-30, 12K, 2 watt resistor (brown, red, orange). Place a 1¼″ piece of small tubing over each lead. Solder one lead to pin 9 of V-5 (2 wires). Connect the other lead to terminal 5 of TS-1.

☑ R-29, 470K resistor, (yellow, violet, yellow). Solder one lead to terminal 5 of TS-1 (5 wires). Solder the other lead to pin 8 of V-4 (2 wires).

☑ R-22, 470K resistor (yellow, violet, yellow). Connect one lead to terminal 4 of TS-1. Connect the other lead to pin 1 of V-4.

☑ R-24, 470K resistor (yellow, violet, yellow). Solder one lead to terminal 4 of TS-1 (4 wires). Solder the other lead to pin 6 of V-4 (2 wires).

☐ C-40, .005 μf disc capacitor. Place a 1¼″ piece of small tubing over one lead. Solder this lead to pin 1 of V-4 (2 wires). Solder the other lead to terminal 1 of R-23.

☑ R-20, 2.2 meg resistor (red, red, green). Connect one lead to terminal 1 of TS-11. Connect the other lead to terminal 2 of TS-11.

☑ C-39, 47 μμf disc capacitor. Solder one lead to terminal 1 of TS-11 (3 wires). Solder the other lead to terminal 2 of TS-11 (4 wires).

☐ The wiring is now complete. Carefully check your work to make sure all connections are correct. CAREFULLY CHECK EVERY CONNECTION FOR—NO SOLDER, TOO LITTLE SOLDER, OR TOO MUCH SOLDER. If a connection appears doubtful, reheat the connection. Trim any excess wire as close as possible to the terminals in all connections made.

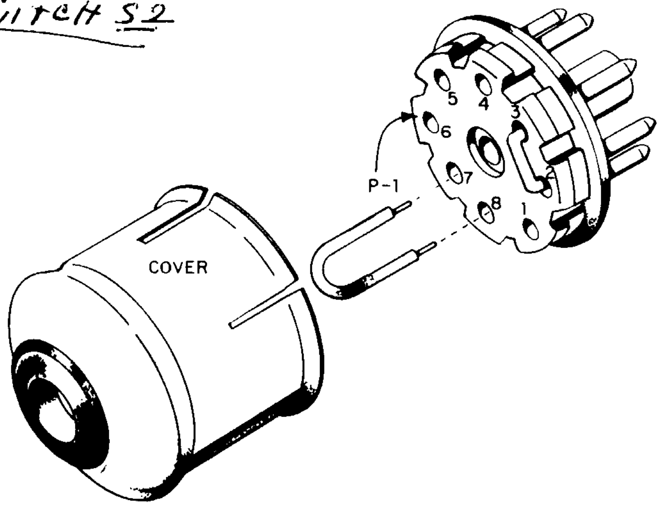


FIGURE 27. WIRING P-1

WIRING P-1

SEE FIGURE 27.

☑ Remove the cover from the 8-pin plug.

☑ Red wire. Solder one end in pin 7. Solder the other end in pin 8.

☑ Red wire. Solder one end in pin 2. Solder the other end in pin 3.

☑ Replace the cover on the plug.

☑ Insert the plug in socket J-1.

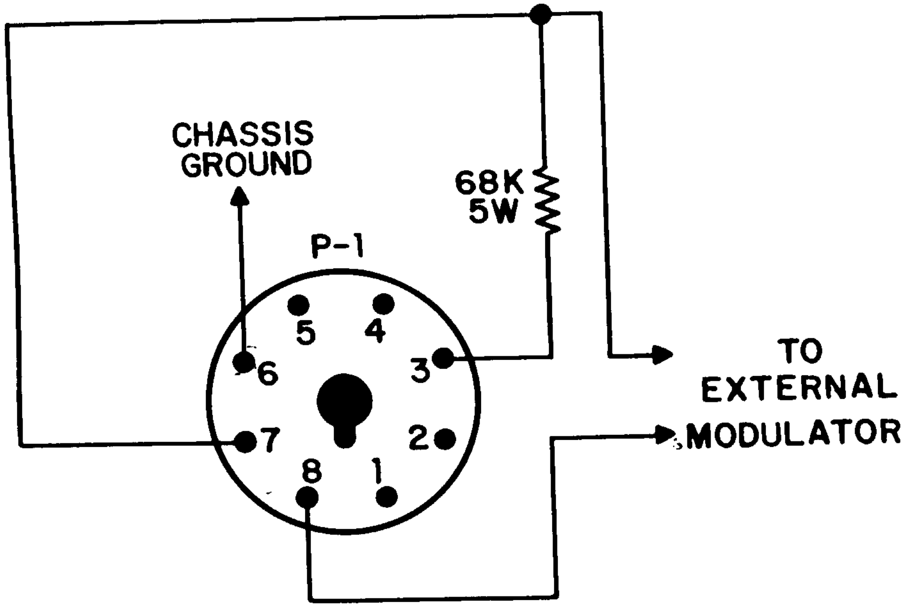


FIGURE 28. ACCESSORY WIRING TO P-1

WIRING P-2

SEE FIGURE 29.

☑ Red wire. Solder one end in pin 1 of P-2, the 11-pin plug. Solder the other end in pin 2.

☑ Red wire. Solder one end in pin 3. Solder the other end in pin 4.

☑ Red wire. Solder one end in pin 7. Solder the other end in pin 8.

☑ Red wire. Solder one end in pin 10. Solder the other end in pin 11.

☑ Place the cover on the plug.

☑ Insert the plug in socket J-2.

WIRING ACCESSORIES TO P-1.

SEE FIGURE 28.

An external modulator can be used, should high-level plate modulation be desired. J-1 and P-1 are provided for this purpose.
Remove the two jumper wires in P-1 before connecting the external modulator. The figure shows the basic connections to attach the modulator.

WIRING ACCESSORIES TO P-2.

SEE FIGURE 30.

An antenna or other control relay may be connected to pins 5 and 6 of P-2. When the FUNCTION switch is in the AM or CW positions, 117 V.A.C. is internally connected to these pins and the external relay will be energized.

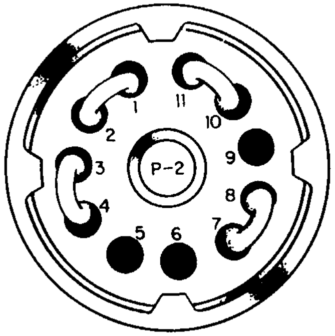


FIGURE 29. WIRING P-2

FINAL ASSEMBLY

☑ Turn the shafts of all controls fully counter-clockwise. ~~(all the way to the left)~~ BUFFER TUNE & OSCILLATOR TUNE CAPACITORS FULLY CLOSED on MESHED,

☑ Place a small knob over the shaft of the METER switch with the marked portion of the knob in the BUFFER GRID position. Fasten the knob to the shaft with the setscrew.

☑ Place small knobs over the shafts of the AUDIO GAIN, BUFFER TUNE and OSCILLATOR TUNE controls with the marked portions of the knobs in the zero positions. Fasten each knob to the shaft.

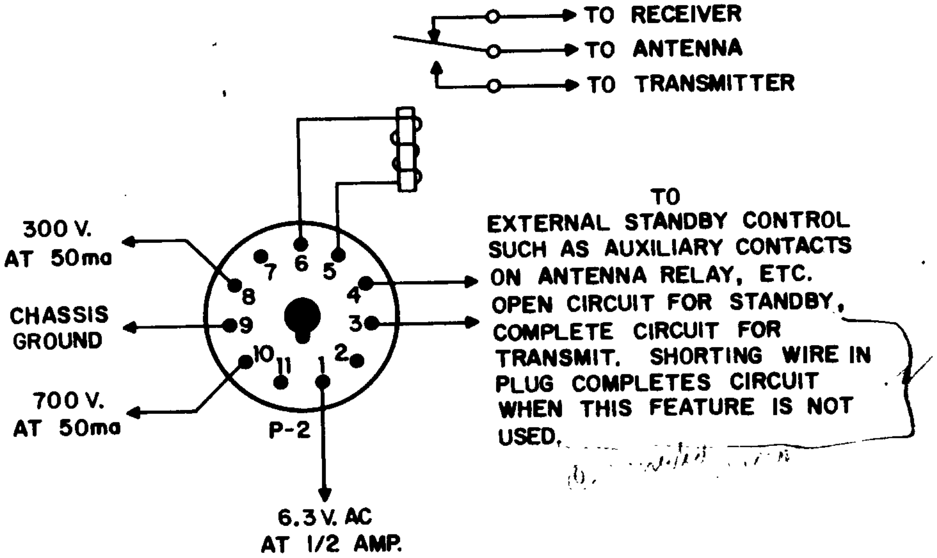
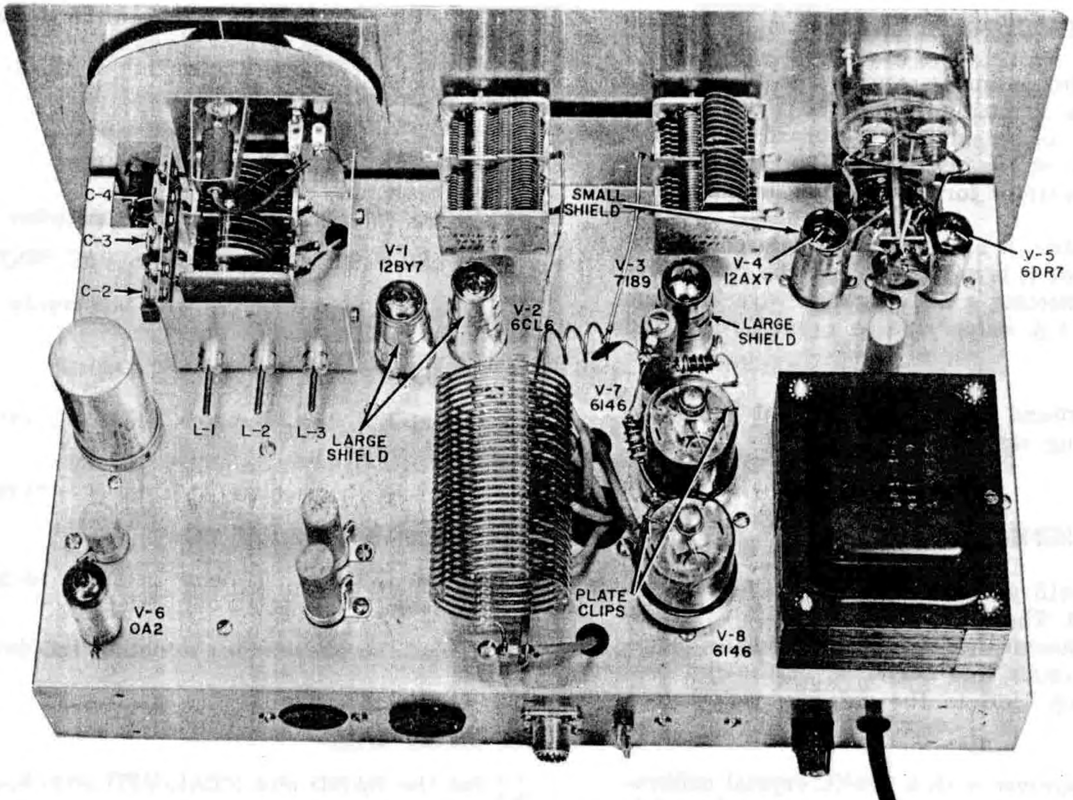

TO RECEIVER
TO ANTENNA
TO TRANSMITTER
300 V. AT 50ma
CHASSIS GROUND
700 V. AT 50ma
7
6
5
8
4
9
3
10
11
1
2
P-2
6.3 V. AC AT 1/2 AMP.
TO EXTERNAL STANDBY CONTROL SUCH AS AUXILIARY CONTACTS ON ANTENNA RELAY, ETC. OPEN CIRCUIT FOR STANDBY, COMPLETE CIRCUIT FOR TRANSMIT. SHORTING WIRE IN PLUG COMPLETES CIRCUIT WHEN THIS FEATURE IS NOT USED.

FIGURE 30. ACCESSORY WIRING TO P-2



**NOTE:
TOP SHIELD HAS
BEEN REMOVED
TO SHOW COIL
LOCATION.**

FIGURE 31. TUBE LOCATION

☑ Place a small knob over the shaft of the BAND switch with the marked portion in the 80 position. Fasten the knob to the shaft.

☑ Place a small knob over the shaft of the XTAL-VFO switch with the marked portion in the XTAL position. Fasten the knob to the shaft.

☑ Place a medium knob over the shaft of the FUNCTION switch with the marked portion in the OFF position. Fasten the knob to the shaft.

☑ Place a medium knob over the shafts of the FINAL TUNE and LOAD controls with the marked portions in the zero positions. Fasten each knob to the shaft.

☑ Place the large knob over the shaft of the VFO TUNING control. Fasten the knob to the shaft.

SEE FIGURE 31.

☐ Insert the tubes into the sockets as shown.
☐ Place the three large shields over the tubes shown.
☐ Place the small shield over the tube shown.
☐ Place the two plate clips on the plate caps of V-7 and V-8.
☑ Four rubber feet. Mount to the bottom of the cabinet with four self-tapping screws.
☐ Remove the two support brackets from the back of the chassis.
☐ Insert the fuse into the fuse holder.
☐ Align the transmitter as instructed on Pages 22 through 24 before installing the unit into the cabinet.
☐ Place the three clip nuts over the holes in the brackets inside the top edge of the cabinet. The flat side of the clip nuts should face outward.
☐ Place the chassis into the cabinet. Fasten with six self-tapping screws and three 6-32 x 3/8″ screws.

ANTENNA AND GROUND SYSTEMS

A well-designed antenna is a must for optimum results. The PI network output circuit makes it possible to match most antennas (40 to 600 ohms). Detailed information on the subjects of antennas is too broad to be covered in this manual. We recommend that you refer to the Radio Operator's Handbook (ARRL) or similar publications for information on antennas.

If the transmitter is to be terminated in any type of single conductor load or antenna (such as a long wire) it is necessary that the chassis be grounded. This can be done by connecting a heavy gauge wire between the ground post on the chassis and a water pipe or ground rod sunk eight feet or more into the earth.

For properly terminated lines, a ground is not essential, but is recommended because it acts as a lightning arrestor.

VFO ALIGNMENT

DO NOT operate the transmitter until you have calibrated the VFO; it may be operating outside the band. There are three methods of alignment described in this chapter: Alignment with a crystal calibrator, alignment using different transmitter crystals, and alignment on-the-air. Connect an antenna or suitable dummy load to the antenna jack before aligning the transmitter.

The most accurate method uses a receiver with a 100KC crystal calibrator. For those receivers without crystal markers there are several models available which can be built into your receiver, such as the Knight Kit Crystal Calibrator (83 Y 256).

Since the adjustments at the low and high ends of the bands are interacting, the alignment procedure for each band should be repeated as many times as necessary to obtain the desired accuracy. Alignment of the 40 meter band also aligns the 20, 15 and 10 meter bands, since they are multiples of the 40 meter band.

When aligning the trimmer capacitors (C-2, C-3 and C-4) you will note that the oscillator will drift off the zero beat when you remove the screwdriver from the capacitor. This is not due to drifting of the VFO, but to the mechanical characteristics of all ceramic trimmer capacitors.

To offset this reaction you will have to tune the trimmers to a point either slightly above or below the zero beat. Then remove the screwdriver from the trimmer. You will note that the oscillator will drift to some point near or at the zero beat (depending on the relative position of the trimmer) and then stabilize. You may have to try this setting several times before you obtain a point where the oscillator will stabilize at the zero beat. After this point is reached, there will be no drift of the VFO.

CRYSTAL MARKER ALIGNMENT

NOTE: Do not disturb the setting of the Buffer and Oscillator controls when aligning the transmitter.

80 METER BAND

☐ Set the BAND and XTAL VFO switches to the 80 meter positions.

☐ Set the FUNCTION switch to VFO SPOT.

☐ Zero beat your receiver with the crystal marker at 3.5 MC—the receiver BFO should be on.

☐ Set the VFO dial to 3.5 MC.

☐ Adjust L-3, the 80 meter VFO coil, until the VFO zero beats with the receiver.

☐ Zero beat the receiver with the crystal marker at 4 MC.

☐ Set the VFO dial to 4 MC.

☐ Adjust C-4, the 80 meter trimmer, to zero beat the VFO with the receiver.

☐ Repeat the above steps to obtain the desired accuracy.

40 METER BAND

☐ Set the BAND and XTAL-VFO switches to the 40 meter position.

☐ Set the receiver to zero beat with the crystal marker at 7 MC.

☐ Set the VFO dial to 7 MC.

☐ Adjust L-2, the 40 meter VFO coil, to zero beat with the receiver.

☐ Zero beat the receiver with the crystal marker at 7.4 MC.

☐ Set the VFO dial to 7.4 MC.

☐ Adjust C-3, the 40 meter trimmer, until the VFO zero beats with the receiver.

☐ Repeat the above steps to obtain the desired accuracy.

6 METER BAND

☐ Set the BAND and XTAL-VFO switches to the 6 meter position.

☐ Zero beat the receiver with the crystal marker at 8.4 MC.

☐ Set the VFO dial to 50.4 MC.

☐ Adjust L-1 to zero beat the VFO with the receiver.

☐ Set the receiver to zero beat with the crystal marker at 9 MC.

☐ Set the VFO dial to 54 MC.

☐ Adjust C-2 to zero beat the VFO with the receiver.

☐ Repeat the above steps to obtain the desired accuracy.

ALIGNMENT WITH CRYSTALS

For this alignment procedure a different crystal for the low and high ends of each band is necessary.

80 METER BAND

☐ Set the BAND switch to 80, the XTAL-VFO switch to XTAL and the FUNCTION switch to VFO SPOT.

☐ Plug the crystal for the low end of the band into the crystal socket.

☐ Tune the receiver to zero beat with the crystal-frequency—the receiver BFO should be on. After tuning the receiver DO NOT change the setting.

☐ Set the VFO dial to the frequency of the crystal.

☐ Place the XTAL-VFO switch in the 80 meter position. Allow a minute for the VFO to warm up.

☐ Adjust L-3 to zero beat the VFO with the receiver.

☐ Set the XTAL-VFO switch to the XTAL position and plug the crystal for the high end of the band into the crystal socket.

☐ Tune the receiver to zero beat with the crystal frequency.

☐ Set the VFO dial to the frequency of the crystal.

☐ Place the XTAL-VFO switch in the 80 meter position.

☐ Adjust C-4 to zero beat the VFO with the receiver.

☐ Repeat the above steps to obtain the desired accuracy.

40 METER BAND

Use the same procedure as the 80 meter band alignment with the following exceptions.

☐ The BAND and XTAL-VFO switches are in the 40 meter positions.

☐ Adjust C-3 for the high end of the band.

☐ Adjust L-2 for the low end of the band.

6 METER BAND

Use the same procedure as the 80 meter band alignment with the following exceptions.

☐ The BAND and XTAL-VFO switches are in the 6 meter positions.

☐ Adjust C-2 for the high end of the band.

☐ Adjust L-1 for the low end of the band.

ON THE AIR ALIGNMENT

This is done by zero beating the VFO frequency with a known operating frequency, such as another Ham operating with a crystal oscillator or an accurately calibrated VFO. When using this method an adjustment at the high and low ends of each band is necessary.

80 METER BAND

☐ Set the VFO dial to the known frequency.

☐ Adjust L-3 for the high end of the band.

☐ Set the VFO dial to the known frequency.

☐ Adjust C-4 for the low end of the dial.

☐ Repeat the above steps to obtain the desired accuracy.

40 METER BAND

☐ Set the VFO dial to the known frequency.
☐ Adjust L-2 for the low end of the band.
☐ Set the VFO dial to the known frequency.
☐ Adjust C-3 for the high end of the band.
☐ Repeat the above steps to obtain the desired accuracy.

6 METER BAND

☐ Set the VFO dial to the known frequency.
☐ Adjust L-1 for the low end of the band.
☐ Set the VFO dial to the known frequency.
☐ Adjust C-2 for the high end of the band.
☐ Repeat the above steps to obtain the desired accuracy.

NEUTRALIZATION

For all practical purposes, sufficiently accurate neutralization of the final is obtained when the two orange wires are positioned as described and shown in the assembly instructions. If, however, a more accurate adjustment is desired, use the following procedure.

☐ Connect a dummy load to the transmitter output.
☐ Using the procedure described under "TUNING", tune up the transmitter on the 20-meter band.
☐ Turn the FUNCTION switch to STAND BY.
☐ Remove octal plug P-1, and the dummy load—IN THAT ORDER.
☐ Turn the OUTPUT METER ADJUST maximum clockwise for greatest sensitivity.
☐ Place the FUNCTION switch in VFO SPOT position.
☐ Rock the FINAL TUNE control for an indication on the meter, while adjusting the position of the orange wires in respect to the plates of both 6146 tubes for a minimum indication of the meter.

FOR THIS PURPOSE, USE AN INSULATED TOOL TO AVOID ANY SHOCK HAZARD.

CURVE HORIZONTALLY

Usually, the best adjustment will be arrived at when the wires ~~rise vertically between the tubes~~ and then curve back horizontally around the glass portion of the tube. The wire should not touch the glass, and should be about the center of the plate of each tube for greatest coupling effect. This one adjustment is sufficient for all bands.

→ AROUND GLASS PORTION OF TUBES AT THE JUNCTION OF THE METAL & GLASS ABOUT 1/16" AWAY FROM THE TUBES.

CONTROL FUNCTIONS

METER: Connects the various test points to the meter for tuning of the transmitter.

AUDIO GAIN: Audio volume control. Controls the amount of carrier modulation in AM operation.

BUFFER TUNE: Matches the output impedance of V-3 to the input impedance of V-7 and V-8.

BAND: Selects the band of frequencies on which you wish to operate.

OSCILLATOR TUNE: Used to resonate the output tank circuit of the oscillator.

XTAL-VFO

XTAL: Use this position when operating with the crystal oscillator.
80: Use this position when operating in the 80 meter band while using the VFO.

40-10: Use this position when operating in either the 40, 20, 15 or 10 meter bands while using the VFO.

6: Use this position when operating in the 6 meter band while using the VFO.

FUNCTION

OFF: Turns power off and on.
VFO SPOT: Used to zero beat the VFO of your transmitter with a station on the air. This allows you to set the frequency of the VFO for a station you wish to contact. Also can be used to find a quiet place on the band by looking for a spot without a zero beat.

AM: Use this position for voice transmission.

STAND-BY: Turn to this position when receiving a reply to a transmission.

CW: Use this position for CW operation with a telegraph key.

FINAL TUNE: Resonates the output Pi network to the operating frequency.

LOAD: Matches the impedance of the antenna to the output of V-7 and V-8. Will match antennas ranging from 40 to 600 ohms.

OUTPUT METER ADJUST: Varies the sensitivity of the meter when the FUNCTION switch is in the RELATIVE OUTPUT position.

OPERATING INSTRUCTIONS

NOTE: You must have a license issued by the Federal Communications Commission to operate this transmitter on the air.

CRYSTAL OPERATION

- ☐ Plug the desired crystal in to the receptacle on the front panel.
- ☐ Set the BAND switch to the desired band of frequencies.
- ☐ Place the XTAL-VFO switch in the XTAL position.
- ☐ Perform the TUNING instructions.

VFO OPERATION

- ☐ Set the BAND switch to the desired band of frequencies.
- ☐ Place the XTAL—VFO switch in the desired band setting; 80 for 80 meter operation; 40—10 for either 40, 20, 15 or 10 meter operation; 6 for 6 meter operation.
- ☐ Perform the TUNING instructions.

TUNING

NOTE: The tune-up is the same for either AM or CW operation.

- ☐ Place the Function switch in the off position. Plug the line cord into a 117 volt 60 cycle AC power outlet.

CAUTION: NEVER REMOVE THE TRANSMITTER FROM THE CASE OR TOUCH ANY OF THE WIRES WHILE THE UNIT IS PLUGGED INTO A POWER OUTLET.

- ☐ Connect an antenna or suitable dummy load—preferably not a light bulb—to the antenna jack on the rear of the chassis. NEVER turn the transmitter on without a dummy load or antenna connected.
- ☐ Set the Function switch in the VFO SPOT position. Allow approximately 30 minutes for the transmitter to warm up.
- ☐ Set the meter switch to the BUFFER GRID position.
- ☐ Adjust the Oscillator Tune control for a maximum meter reading.
- ☐ Place the meter switch in the FINAL GRID position.
- ☐ Adjust the Buffer Tune control for a maximum reading (not to exceed 10 ma). MAX OUTPUT WILL BE OBTAINED AT ABOUT 2 MA AS YOU REDUCE METER READING

TO THIS VALUE ADJUST BUFFER TUNE TO MAXIMUM CAPACITY SIDE

NOTE: On 6 meter operation adjustment of the Buffer Tune control will result in a reading of approximately 1 ma. This drive is sufficient to provide full output on 6 meter operation.

- ☐ Set the meter switch to RELATIVE OUTPUT.

NOTE: On 6 meter band operation set the Final Tune control to 10.

- ☐ Place the Function switch in the AM position.
- ☐ Simultaneously adjust the Final Tune and Load controls for maximum meter reading. Be sure the output is as high as possible and not just close. This adjustment is very important on 6 meter operation.

NOTE: If for any reason the transmitter is loaded in the CW position without first tuning in the AM position, turn the Load control fully counter-clockwise before placing the Function switch in the CW position. This will insure that the final tubes do not draw an excessive amount of current.

- ☐ Place the Function switch in the CW position for the following adjustment. Do this adjustment as quickly as possible and then return the Function switch to the STANDBY position.
- ☐ For 6 meter operation turn the Load control a few degrees clockwise. This should bring the plate current down to 250 ma. Then adjust the Final Tune control for maximum output. The maximum power output may occur at a point other than minimum plate current. Therefore adjust the Final Tune control for maximum power output without exceeding the maximum permissable plate current of 250 ma.
- ☐ For 10 through 80 meter band operation, simultaneously adjust the Final Tune and Load controls for a maximum ~~meter reading~~ RELATIVE POWER OUTPUT BUT DO NOT EXCEED THE MAX. PERMISSIBLE PLATE CURRENT OF 250 MA,

NOTE: On the lower bands it is possible to overdrive the 6146 tubes. Therefore, after adjusting the Final Tune and Load controls, detune the Buffer Tune control ~~for maximum relative power output~~ TO THE MAXIMUM CAPACITY SIDE. FOR MAX RELATIVE POWER OUTPUT THIS WILL BE APPROX. 2MA ON THE BANDS WHERE EXCESSIVE DRIVE IS POSSIBLE.

- ☐ Place the function switch in the STAND-BY position if you have not already done so.

CW OPERATION

- ☐ Place the key in the KEY jack.
- ☐ Set the FUNCTION switch to the CW position.

AM OPERATION

- ☐ Connect a microphone to the MIC jack.
- ☐ Place the FUNCTION switch in the AM position.

FREQUENCY COVERAGE

The chart below lists the frequencies of operation for the different bands.

BAND (Meters)	Frequency of Crystal or VFO (MC)	Transmitter Freq. Range (MC)
80	3.5 to 4.0	3.5 to 4.0
40	7.0 to 7.3	7.0 to 7.3
20	7.0 to 7.175	14.0 to 14.35
15	7.0 to 7.150	21.0 to 21.45
10	7.0 to 7.425	28.0 to 29.7
6	8.334 to 9.0	50.0 to 54.0

From the above information you can select the crystals for the bands in which you wish to operate.

SERVICE HINTS

The operating voltages are located on the schematic diagram. Resistance readings are located on the resistance chart. Never measure resistances with the transmitter turned on.

The troubleshooting chart on this page may help you locate the source of your trouble.

RESISTANCE CHART

TUBE	PINS								
	1	2	3	4	5	6	7	8	9
V-1	34Ω	15K	0	0	0	0	13K	16K	0
V-2	360Ω	135K	40K	0	0	4.5K	0	40K	135K
V-3	90K	[illegible] 39K	500Ω	0	0	—	4.5K	—	2.3K
V-4	800K	2.2M	0	0	0	800K	†	1.5K	0
V-5	20K	1M	1M	0	0	1M	10M	0	50K
V-6	13K	0		0	13K		0	—	—
V-7	2.9K*	0	40K	2.9K*	20K	2.9K*	0	0	—
V-8	2.9K*	0	40K	2.9K*	20K	2.9K*	0	0	—

† Will vary with setting of Gain control.

* Indicates reading taken with Function Switch in AM position.

Resistance readings taken with common lead of VOM connected to chassis. Function switch in CW and Band switch in "80" position.

TROUBLE	POSSIBLE CAUSE	SERVICE PROCEDURE
Blows Fuse	Short in power supply Function switch incorrectly wired.	Check resistance. Check wiring of CR-1 and CR-2. Check wiring of Function switch.
No meter reading	Bad Crystal Defective tube V-1 or V-2. Incorrect Wiring in Oscillator circuit. CR-3 defective.	Replace Crystal. Replace tube. Check wiring of V-1 and V-2. Replace CR-3.
Meter reads backwards	Meter leads reversed. CR-3 wired backwards.	Reverse meter leads. Check CR-3 wiring.
Tubes don't light	Incorrect filament wiring. Fuse blown or defective.	Check filament wiring. Replace fuse.
Erratic antenna loading	Poor ground connection. Bad antenna connection.	Check ground connection. Check connections to antenna.
No modulation	Gain control not turned up. Function switch set incorrectly. Defective 12AX7 or 6DR7. Bad mike connection.	Turn up Gain control. Check setting of switch. Replace defective tube. Check mike connection.
Television Interference	Poor gound connection. Poor bond between chassis and cabinet. Transmitting antenna too close to TV antenna.	Check ground connection. Make sure chassis is tightly secured to cabinet. Separate antennas until no interference is present.

CIRCUIT DESCRIPTION

VARIABLE FREQUENCY OSCILLATOR (VFO)

V-1, the 12BY7 is used as a Series-Tuned Colpitts (commonly called Clapp) oscillator. The tube is tapped across only a small portion of the oscillating tank circuit, resulting in very loose coupling between the tube and circuit. The taps are provided by C-10 and C-11 in series across the coil. In addition these large capacitors (750 $\mu\mu$f) shunt the tube capacitances, so the effects of the tube—changes in electrode voltages and loading—are still further reduced. The output frequencies are developed across L-1 and C-1A for the 6 meter band; L-2 and C-1B for the 10, 15, 20 and 40 meter bands and L-3 and C-1C for the 80 meter band. Three trimmer capacitors are in parallel with C-1 to calibrate the VFO.

CRYSTAL OSCILLATOR

V-2, the 6CL6 serves a dual purpose in the transmitter. When the XTAL-VFO switch is in the VFO position V-2 acts as an amplifier for the signal from V-1, the VFO. When the switch is in the crystal position V-1 is cut off and V-2 acts as a modified Pierce type crystal controlled oscillator. In this circuit the screen grid is used as the plate in a triode oscillator. Power output is taken from the tuned circuit in the actual plate circuit. The tuned plate circuit consists of C-18 and L-6 for the 80 meter band; C-18 and L-7 for the 40, 20 and 15 meter band; C-18 and L-8 for the 10 meter band and C-18 and L-9 for the 6 meter band.

MULTIPLIER/BUFFER

A multiple of the input frequency to V-3 (7189) the Multiplier/Buffer stage can be obtained by tuning the output circuit — C-21 and coils L-10 through L-15 (depending on the band used) — to a harmonic of the exciting frequency instead of the fundamental. The circuit otherwise is the same as that of a straight amplifier, thereby serving the dual purpose of a buffer amplifier and a multiplier.

AM OPERATION

The input signal from the microphone is amplified by both sections of V-4, the 12AX7 dual triode, and then applied to the input of V-5A. V-5A is zero biased, and thus with modulation, grid rectification results causing the grid voltage to rise. V-5A being directly coupled to the grid of V-5B causes the cathode voltage of V-5B to vary at a rate proportional to the applied modulation. C-42 and R-47 determine the time constant at which this variation takes place.

A portion of the cathode voltage of V-5B is applied to the screens of V-7 and V-8, the two RF Output Amplifiers. This voltage varies at an audio rate proportional to the amount of modulation; thus modulating the screens of V-7 and V-8 while simultaneously increasing the average DC potential on the screens.

CW OPERATION

The cathodes of V-1, V-2, V-3, V-7 and V-8 are keyed for CW operation. To prevent excessive voltage at the key terminals R-21, a 2.2K resistor is connected across the key jack. The voltage developed across this resistor acts as a bias for V-1. During the "Key-up" period when the output amplifiers are cut off the tubes are still drawing some current through R-21, which helps to stabilize the DC power supply.

RF OUTPUT AMPLIFIER

V-7 and V-8, the two 6146 output amplifiers are connected in parallel.

The plate circuits of the tubes have separate chokes to eliminate any parasitic oscillations.

POWER SUPPLY

Transformer T-1 supplies 6.3 VAC for the tube filaments and a high AC voltage to rectifiers CR-1 and CR-2. The rectifiers are connected in a full-wave voltage doubler circuit to supply the necessary high voltage for the transmitter.

V-6, the Voltage Rectifier is an OA2 gas-filled, cold-cathode voltage regulator. It has a practically constant internal voltage drop across which the load requiring voltage regulation is connected.

PARTS LIST

CAPACITORS

All capacitors ceramic disc, 20% tolerance unless otherwise specified.

Symbol Number	Description	Part Number
C-1	3-section variable, VFO	286055
C-2	4.5-25 ~~7-45~~ μμf trimmer	28400~~2~~4
C-3	4.5-25 ~~7-45~~ μμf trimmer	28400~~2~~4
C-4	4.5-25 ~~7-45~~ μμf trimmer	28400~~2~~4
C-5	39 μμf, 500 volts, 5% mica	266552
C-6	68 ~~47~~ μμf, 500 volts, 5% mica	~~296066~~ 26655[illegible]
C-7	39 μμf, 500 volts, 5% mica	266552
C-8	.005 μf, 600 volts	296000
C-9	.005 μf, 600 volts	296000
C-10	750 μμf, 500 volts, 5% ~~tubular~~ MICA	299062 26[illegible]1
C-11	750 μμf, 500 volts, 5% mica	266551
C-12	470 μμf, 600 volts	276478
C-13	.001 μf, 600 volts	276016
C-14	.005 μf, 600 volts	296000
C-15	.05MF ~~470 μμf, 600~~ volts 400 V	~~276478~~ 275506
C-16	1-section variable	286053
C-17	.005 μf, 600 volts	296000
C-18	.005 μf, 600 volts	296000
C-19	.005 μf, 600 volts	296000
C-20	.005 μf, 600 volts	296000
C-21	1-section variable	286053
C-22	330 μμf, 600 volts, ±5% silver mica	266555
C-23	1000 μμf, 500 volts, 10% mica	266014
C-24	.005 μf, 600 volts	296000
C-25	.005 μf, 600 volts	296000
C-26	.005 μf, 600 volts	296000
C-27	.001 μf, 600 volts	276016
C-28	.001 μf, 600 volts	276016
C-29	.005 μf, 600 volts	296000
C-30	.005 μf, 600 volts	296000
C-31	.005 μf, 1000 volts	277054
C-32	2-section variable	286057
C-33	.005 μf, 1000 volts	277054
C-34	.005 μf, 600 volts	296000
C-35	2-section variable	286056
C-36	.005 μf, 600 volts	296000

CAPACITORS (Cont.)

Symbol Number	Description	Part Number
C-37	.005 μf, 600 volts	296000
C-38	.02 μf, 600 volts	277025
C-39	47 μμf, 500 volts	276479
C-40	.005 μf, 600 volts	296000
C-41	.1 μf, 400 volts, tubular	245014
C-42	.001 μf, 600 volts	276016
C-43	.1 μf, 400 volts, tubular	245014
C-44	.001 μf, 600 volts	276016
C-45	.001 μf, 600 volts	276016
C-46	40 μf, 450 volt, electrolytic	205400
C-47	40 μf, 450 volt, electrolytic	205400
C-48	40/40 μf, 450 volt, electrolytic	248151
C-49	.005 μf, 600 volts	296000
C-50	.02 μf, 600 volts	277025
C-51	.005 μf, 600 volts	296000
C-52	.005 μf, 600 volts	296000
C-53	.005 μf, 600 volts	296000
C-54	.005 μf, 600 volts	296000
C-55	.02 μf, 600 volts	277025
C-58	.005 μf, 600 volts	296000
C-59	.005 μf, 600 volts	296000
C60 —	15 MMF N750 ± 20%	277159
C61 —	10 MMF. 500V N750 - 10%	290050

COILS

Symbol Number	Description	Part Number
L-1	VFO coil, 6 meter, orange dot	162157
L-2	VFO coil, 40 meter, yellow dot	~~162158~~ 162183
L-3	VFO coil, 80 meter, red dot	~~162150~~ 162182
L-4	RF choke, 5 mh	161001
L-5	RF choke, 5 mh	161001
L-6	Osc. coil, 80 meter, violet dot	142051
L-7	Osc. coil, 40 meter, gray dot	162167
L-8	Osc. coil, 10 meter, black dot	162166
L-9	Osc. coil, 6 meter, white dot	162165
L-10	Mult. coil, 6 meter	152154
L-11	Mult. coil, 10 meter, orange dot	162161
L-12	Mult. coil, 15 meter, green dot	162162
L-13	Mult. coil, 20 meter, blue dot	162163
L-14	Mult. coil, 40 meter, yellow dot	162164
L-15	Mult. coil, 80 meter, red dot	142052
L-16	Parasitic suppressor	162180
L-17	Parasitic suppressor	162180

COILS (Cont.)

Symbol Number	Description	Part Number
L-18	RF choke (final)	162156
L-19	Output coil, 6 meter	~~152153~~ [illegible]
L-20	Final tank coil	~~152155~~ 152160
L-21	Line filter, 2.2 μh	152005 16216
L-22	Line filter, 2.2 μh	152005
L-23	Choke, 2.2 μh	152005 162166
L-24	Parasitic suppressor	162181

DIODES

Symbol Number	Description	Part Number
CR-1	Silicon rectifier	630053
CR-2	Silicon rectifier	630053
CR-3	Diode	630057

JACKS

Symbol Number	Description	Part Number
J-1	8-pin	501180
J-2	11-pin	502200
J-3	Microphone	502122
J-4	Key	509051
J-5	Crystal	509053
J-6	Crystal	509053
J-7	Antenna	502222

PLUGS

Symbol Number	Description	Part Number
P-1	8-pin	502181
P-2	11-pin	502100

RESISTORS

All resistors 10% tolerance, ½ watt unless otherwise specified.

Symbol Number	Description	Part Number
R-1	15K	301153
R-2	1500 Ω	301152
R-3	100K	301104
R-4	1K, 1 watt	304102
R-5	39K	301393
R-6	390 Ω	301391
R-7	~~100K~~ 3.9	301104
R-8	560 Ω, 5%	302561
R-9	390 Ω, 1 watt	304391
R-10	1000 Ω, 2 watt	307102
R-11	560 Ω, 5%	302561
R-12	22K, 2 watt	307223
R-13	10 Ω	301100
R-14	10 Ω	301100

RESISTORS (Cont.)

Symbol Number	Description	Part Number
R-15	10 Ω, 1 watt, 5%	305100
R-16	100K control, 30%, long shaft	392162
R-17	4700 Ω	301472
R-18	1500 Ω	301152
R-19	4700 Ω	301472
R-20	2.2 meg	301225
R-21	2.2K, 2 watt	307222
R-22	470K	301474
R-23	100K control, 30%	392151
R-24	470K	301474
R-25	1500 Ω	301152
R-26	270K	301274
R-27	10 meg	301106
R-28	1 meg	301105
R-29	470K	301474
R-30	12K, 2 watt	307123
R-31	47K, 1 watt	304473
R-32	10 Ω, 20 watt, wire wound	317851
R-33	150 Ω, 20 watt, wire wound	317852
R-34	150 Ω, 20 watt, wire wound	317852
R-35	12K, 2 watt	307123
R-36	39K, 2 watt	307393
R-37	4K, 10 watt, wire wound	374017
R-38	68K, 2 watt	307683
R-39	8.2K, 2 watt	307822
R-40	~~4.7K~~ 10K	301103 301472
R-41	~~4.7K~~ 10K	301103 301472
R-42	4.7K	301472
R-43	4.7K	301472

SWITCHES

Symbol Number	Description	Part Number
S-1	3-wafer, Function	437062
S-2	4-wafer, Band	437064
S-3	2-wafer, Xtal-VFO	437063
S-4	Single wafer, Meter	437061

TERMINAL STRIPS

Symbol Number	Description	Part Number
TS-1	4-terminal	440505
TS-2	6-terminal, standup	442403
TS-3	3-terminal	440301
TS-4	3-terminal	440301

TERMINAL STRIPS (Cont.)

Symbol Number	Description	Part Number
TS-5	3-terminal	440302
TS-6	2-terminal	440201
TS-7	2-terminal	440203
TS-8	3-terminal	440305
TS-9	5-terminal	440501
TS-10	4-terminal	440401
TS-11	2-terminal	440203
TS-12	1-terminal	440102
TS-13	2-terminal	440202
TS-14	3-terminal	440301
TS-15	3-terminal	440301
TS-16	2-terminal	440203

TUBES

Symbol Number	Description	Part Number
V-1	12BY7	610070
V-2	6CL6	610016
V-3	7189	610069
V-4	12AX7	611012
V-5	6DR7	611033
V-6	OA2	610019
V-7	6146	614153
V-8	6146	614153

MISCELLANEOUS

Description	Quantity	Part Number
Base, Shield	4	511001
Bracket, control	1	470462
Bracket, large L	1	470463
Bulb, pilot #47	1	640002
Cabinet	1	702056
Chassis	1	463475
Chassis, tubing	1	470465
Chassis, tuning sub	1	470466
Clip, plate	2	501193
Collar, threaded	1	470253
Cover, 11-pin plug	1	511003
Dial	1	870151
Foot, rubber	4	831001
Fuse, 4 amp., 3AG	1	491005
Grommet, small	1	830100
Grommet, medium	4	830200

MISCELLANEOUS (Cont.)

Description	Quantity	Part Number
Grommet, large	1	830700
Holder, fuse	1	492200
Knob, small	6	765054
Knob, medium	3	765053
Knob, large	1	765052
Label	1	750283
Leg, support	2	470467
Manual, instruction	1	750383
Meter	1	659252
Panel, front	1	463525
Plate, capacitor mounting	1	501542
Plate, plastic	1	770053
Ring, lock	1	532002
Socket, 7-pin	1	501170
Socket, 8-pin	2	501180
Socket, 9-pin	4	501190
Socket, 9-pin with center pin	1	509067
Socket, pilot light	1	501194
Shield, bottom	1	470557
Shield, top	1	470556
Shield, large tube	3	510014
Shield, small tube	1	511001
Spacer	2	940008
Transformer	1	107256

HARDWARE

Description	Quantity	Part Number
Angle clips	4	531016
Clip nut, 6-32	3	531009
Lockwasher, #4	25	582200
Lockwasher, #6	49	582300
Lockwasher, ⅜″	3	582700
Lockwasher, ½″	1	582800
Nut, 4-40	26	570221
Nut, 6-32	34	570340
Nut, 8-32	5	570440
Nut, 10-32	1	570540
Nut, ¼″	2	579751
Nut, ⅜″	13	570840
Nut, ½″	1	570960
Nut, wing	1	572540
Screw, 4-40 x ¼″	20	560222
Screw, 4-40 x ⅜″	6	560224
Screw, 6-32 x ¼″	49	560342
Screw, 6-32 x 3/16″	3	560341
Screw, 6-32 x ⅜″	3	560344
Screw, 8-32	4	560442
Screw, 10-32	1	560547

HARDWARE (Cont.)

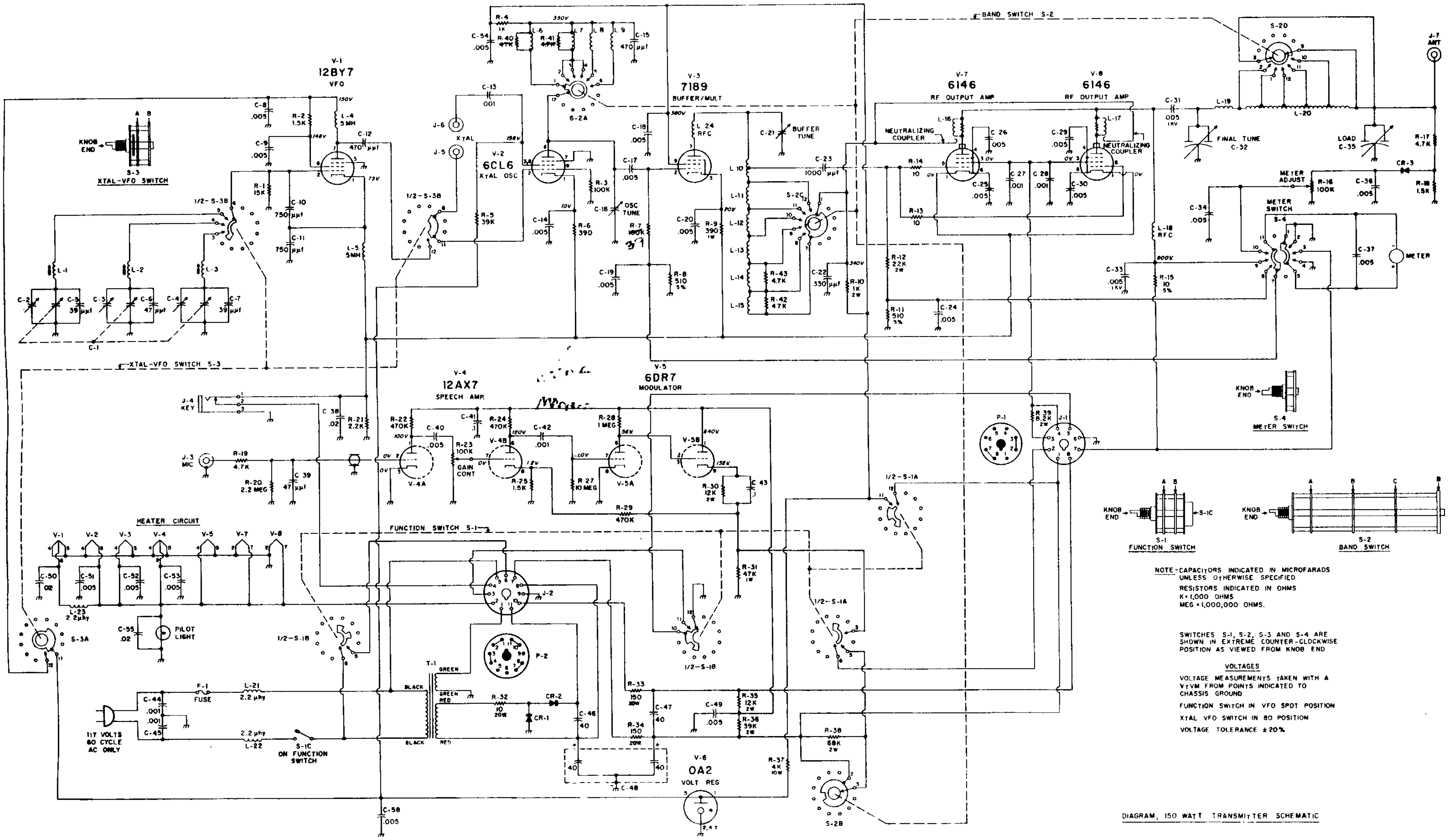
Description	Quantity	Part Number
Screw, self-tapping	14	562393
Screw, set	1	563342
Solder lug, #6	4	553005
Solder lug, #8	9	553002
Solder lug, #10	2	553004
Washer, flat metal, ⅜″	1	580702
Washer, flat fiber	1	590400
Washer, shouldered fiber	1	591401

WIRE, SOLDER AND TUBING

Description	Quantity	Part Number
Cable, 4″ piece	1	809054
Line cord	1	802004
Solder, 10′ length	2	930005
Tubing, small, 10″ length	1	812024
Tubing, large, 36″ length (fiberglass)	1	812003
Tubing, large, 8″ length (fiberglass)	1	812020
Tubing, large, 3″ length (Durasyl)	1	813159
Wire, 2″ red	21	801002
Wire, 3″ orange	15	801003
Wire, 4″ yellow	13	801004
Wire, 5″ green	9	801005
Wire, 6″ blue	7	801006
Wire, 7″ violet	7	801007
Wire, gray	3	801008
Wire, 9″ white	2	801009
Wire, 10″ brown	4	801010
Wire, 11″ brown-white	1	801011
Wire, 12″ red-white	7	801012
Wire, 14″ yellow-white	2	801014
Wire, 15″ green-white	2	801015
Wire, stranded, 3½″ black-white	1	804093
Wire, stranded, 4¼″ red-white	2	804091
Wire, large bare, 20″ length	1	806620
Wire, small bare, 12″ length	2	806012

TOOLS NEEDED FOR CONSTRUCTION

Stock Number	Description	Price*
46 N 852	Soldering iron, pencil type	$ 5.78
50 N 132	Long-nose pliers, 6″	2.10
50 N 133	Diagonal cutters, 5″	1.84
45 N 378	Screwdriver, 6″	.68



NOTE-CAPACITORS INDICATED IN MICROFARADS UNLESS OTHERWISE SPECIFIED

RESISTORS INDICATED IN OHMS
K = 1,000 OHMS
MEG = 1,000,000 OHMS.

SWITCHES S-1, S-2, S-3 AND S-4 ARE SHOWN IN EXTREME COUNTER-CLOCKWISE POSITION AS VIEWED FROM KNOB END

VOLTAGES

VOLTAGE MEASUREMENTS TAKEN WITH A VTVM FROM POINTS INDICATED TO CHASSIS GROUND

FUNCTION SWITCH IN VFO SPOT POSITION

XTAL VFO SWITCH IN 80 POSITION

VOLTAGE TOLERANCE ± 20%

DIAGRAM, 150 WATT TRANSMITTER SCHEMATIC

FIGURE 32. SCHEMATIC DIAGRAM OF T-150

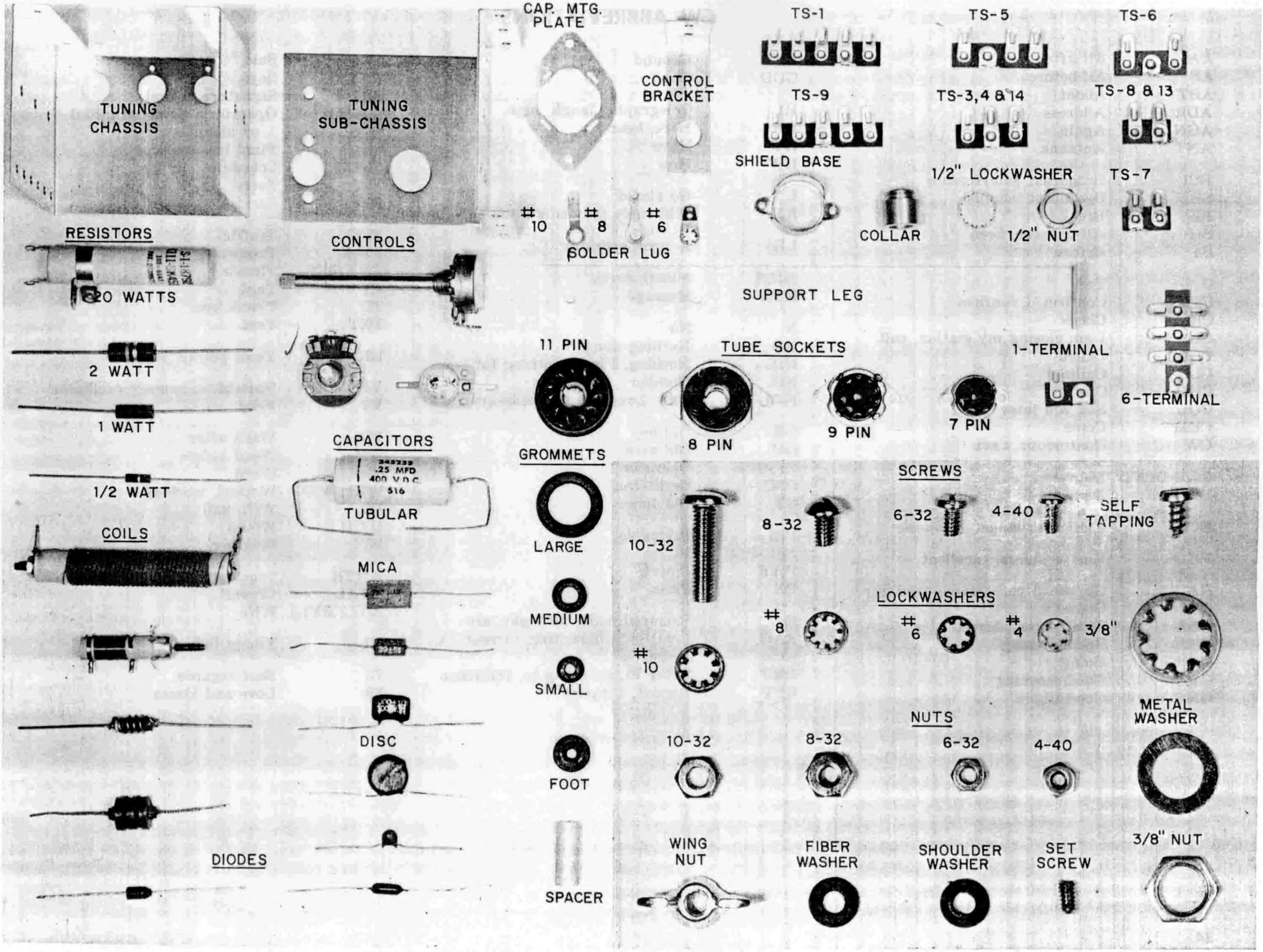
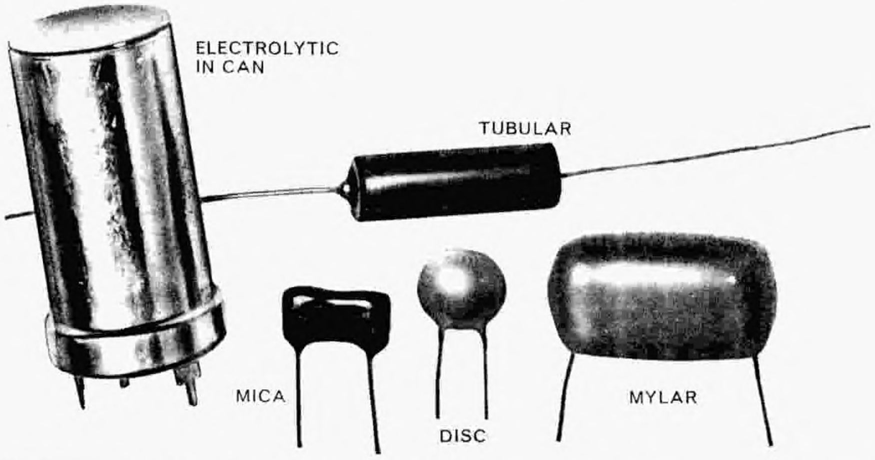


FIGURE 33. PARTS IDENTIFICATION

CW ABBREVIATIONS

AA	All after
AB	All before
ABT	About
ADR	Address
AGN	Again
ANT	Antenna
BCI	Broadcast Interference
BCL	Broadcast listener
BK	Break
BN	All between, been
B4	Before
C	Yes
CFM	Confirm, I confirm
CK	Check
CL	I am closing my station, call
CLD	Called
CLG	Calling
CUD	Could
CUL	See you later
CUM	Come
CW	Continuous wave
DLD-DLVD	Delivered
DX	Distance
ECO	Electron-coupled oscillator
FB	Fine business, excellent
GA	Go ahead (or resume sending)
GB	Good-by
GBA	Give better address
GE	Good evening
GG	Going
GM	Good morning
GN	Good night
GND	Ground
GUD	Good
HI	Telegraphic laugh, high
HR	Here, hear
HV	Have
HW	How
K	Go ahead
KN	Will reply only to station called
LID	A poor operator
MILS	Milliamperes
MSG	Message
N	No
ND	Nothing doing
NIL	Nothing, I have nothing for you
NR	Number
NW	Now, I resume transmission
OB	Old boy
OM	Old man
OP-OPR	Operator
OSC	Oscillator
OT	Old timer
PBL	Preamble
PSE-PLS	Please
PWR	Power
PX	Press
R	Received solid, all right, are
RAC	Rectified alternating current
RCD	Received
REF	Refer to, referring to, reference
RPT	Repeat, I repeat
SED	Said
SEZ	Says
SIG	Signature, signal
SINE	Operator's personal initial or nickname
SK	Final transmission
SKED	Schedule
SRI	Sorry
SVC	Service
TFC	Traffic
TMW	Tomorrow
TNX-TKS	Thanks
TT	That
TU	Thank you
TXT	Text
UR	Your, you're, yours
VFO	Variable-frequency oscillator
VY	Very
WA	Word after
WB	Word before
WD	Word
WKD-WKG	Worked, working
WL	Well, will
WUD	Would
WX	Weather
XMTR	Transmitter
XTAL	Crystal
XYL(MYL)	Wife
YL	Young lady
73	Best regards
88	Love and kisses

CAPACITORS and RESISTORS



CAPACITOR IDENTIFICATION

The capacitors in your kit (named for their *capacity* for storing electrical energy) may be of several different types. You must choose the correct capacitor for each step, or the kit will not work as designed.

TYPE OR SHAPE. Select by type or shape such as disc, tubular, mylar, mica or electrolytic in a can.

CAPACITY VALUE. Select by capacity value, given in microfarads (μf or mf) or micro-microfarads (μμf, mmf or pf). Most small values are stated in micro-microfarads such as 10 μμf and 270 μμf. Larger values are given in microfarads as .02 μf and .015 μf.

On some disc capacitors, values may be stated either in μf or μμf. To change from μf to μμf, simply move the decimal point to the right 6 places. Here are a few examples of alternate markings:

.0022 μf equals 2200 μμf
.01 μf equals 10,000 μμf
.0033 μf equals 3300 μμf

VOLTAGE RATINGS. The capacitor may be marked with the maximum operating voltage, such as 600 v, 500 v, 350 wvdc. Where these are important they will be stated.

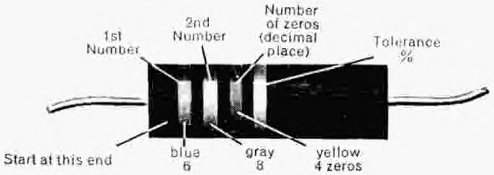
TOLERANCE ratings are given in percentages (%). Where these are important they will be stated. Manufacturer's type number such as: SK, BIT, SPRAGUE, CRL, Z5F etc. are not used for identification purposes.

RESISTORS

Resistors are used to *resist* the flow of electricity. For your convenience, the resistors in your kit are supplied carded and labeled by R numbers for ready identification. Variable resistors (controls) and resistors too large to fit on the resistor card are clearly marked with the resistance value, either in ohms (Ω), thousand ohms (K) or million ohms (meg). The electronics color code used for the color bands on the resistors is easy to learn. Numbers 0 through 9 are shown by these colors:

0 . . . black
1 . . . brown
2 . . . red
3 . . . orange
4 . . . yellow

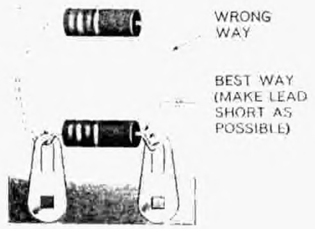
5 . . . green
6 . . . blue
7 . . . violet
8 . . . gray
9 . . . white



To read the value of a resistor, start at the end closest to the color bands. Write down the number for the *first band*, 6 (blue) in the example shown on this page, To the right of 6, write the number for the *second band*, 8 (gray) in our example. *The third band* gives the number of zeros. Since the third band in our example is yellow, write 4 zeros (0000) next to the 68, making the number 680,000 ohms. This is usually given in a short form, 680K, with K standing for a thousand ohms.

The fourth color band shows the tolerance rating, or how closely the resistance value is controlled in manufacture. Silver indicates a tolerance of ±10%, gold, ±5%.

SPECIAL CASE. For resistors under 10 ohms, the third color band will be silver or gold. If the third band is gold, the resistor is between 1 and 10 ohms so the decimal point goes between the first and second digit. For example, blue, gray, gold is 6.8 ohms. But if the third band is silver, the value is less than 1 ohm, with the decimal point before the first digit. For example, blue, gray, silver is .68 ohms.


WRONG WAY
BEST WAY (MAKE LEAD SHORT AS POSSIBLE)

MOUNTING RESISTORS AND CAPACITORS

Keep resistor and capacitor leads SHORT. Mount the part as shown in the wiring illustrations . . . then pull the leads all the way through. Cut off excess lead length. Proper soldering techniques are shown on the other side.

ALLIED SERVICE FACILITIES

FREE INFORMATION SERVICE

First, write a letter to us if your wired kit does not operate properly. Address KNIGHT-KIT Dept. at Allied Radio. Give the stock number of the kit, date of purchase and describe the problem. In a great many cases our technicians can determine corrective steps from the information in your letter. This free information service may save you the expense and inconvenience of returning the kit for repairs.

Should it appear that work in our shop is necessary, we will send you a pre-addressed label and specific packing instructions for your kit.

SPECIAL INSPECTION SERVICE

You may return this wired KNIGHT-KIT for inspection and repair within one year after purchase for a special service charge of **$15.00. An** additional charge will be made for any parts damaged in construction or for parts beyond the EIA 1 year warranty period. Service charges for kits returned after the one year period will be based on the length of time needed to repair the unit plus the cost of any parts required.

PLEASE NOTE: Kits soldered with acid core solder, paste flux, or with irons cleaned on a sal ammoniac block are not eligible for repair or service because they have been permanently damaged by the acid flux.

PACKING INSTRUCTIONS

If you return this kit, pack it well. Do NOT use the original carton—it is too small for the assembled kit. To prevent damage in shipment, use a carton large enough so that cushioning material can be placed around the instrument. Cushion it well and tightly.

Mark it: FRAGILE—DELICATE ELECTRONIC EQUIPMENT.

We recommend that this equipment be shipped ONLY by Railway Express, if at all possible, to forestall damage in shipment. Send the kit prepaid and insured. We will return the repaired kit to you C.O.D. as soon as repairs are completed. If you wish to save C.O.D. fees, your advance remittance may be enclosed for standard repair charges plus transportation costs. Any excess remittance will be refunded.

IF YOUR KIT ARRIVED DAMAGED

If your kit was damaged in a parcel shipment, please write us at once, describing the condition in which the shipment was received. If your kit was part of a Railway Express shipment that was damaged in transit, please notify the local Railway Express agent at once and then write us.

KNIGHT-KIT GUARANTEE

Allied fully protects your Knight-Kit purchase with this exclusive money-back guarantee. Your Knight-Kit must meet with your complete satisfaction or your purchase price is refunded.

In addition, we guarantee that only premium-quality components are selected for use in Knight-Kits. Every Knight-Kit component is fully warranted against defects in material and workmanship for a period of one year from date of original purchase. Should replacement parts be required under this warranty, notify us promptly, including sufficient details to identify the required parts. Parts will be shipped without charge. We reserve the right to request the return of defective parts.